

TRAFFIC SIGNAL DESIGN GUIDELINES

January, 2006

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APPENDIX C — SAMPLE ESTIMATE OF COST, SIGNAL PLANS, AND DETAIL SHEETS

Estimate of Cost

Federally Funded Project Cover Sheet

County Funded Project/Private Developer Cover Sheet

Summary of Quantities

Traffic Signal Modernization Plan (for intersection without a temporary signal)

Cable Plan (for intersection without a temporary signal)

Temporary Traffic Signal Installation

Temporary Cable Plan

Traffic Signal Modernization Plan – Sheet 1 of 2

Traffic Signal Modernization Plan – Sheet 2 of 2

Cable Plan

Sequence of Operations

Interconnect Plan

Interconnect Schematic

Mast Arm Mounted Street Name Signs

Video System Schematic

LCDOT Standard Traffic Signal Design Detail Sheets

Typical Pavement Markings for County Highways Sheets

IDOT District I Standard Traffic Signal Design Detail Sheets

PLAN APPROVAL PROCESS

1. Designer Prequalification

The firm supplying plans to the Lake County Division of Transportation (LCDOT or County) must be prequalified with the Illinois Department of Transportation in "Special Plans - Traffic Signals," and its signal design staff shall be familiar with the latest traffic signal design procedures used by the County.

The firm's signal designer may schedule a preliminary meeting with the County Traffic Engineer to discuss project specific issues on projects involving complex designs. If requested by the County, the signal designer shall provide copies of their most recent traffic signal installation design and/or modification projects completed for projects in the County.

Interaction between a traffic signal design firm and the County must be on a shared benefit basis. If, in the opinion of the County, the firm is attempting to design plans beyond the level of competence of its staff, the County may refuse further review until qualified assistance is acquired and approved.

The firm is expected to provide interpretive assistance and revisions to their work up to and through the construction phase of the project.

2. Items Available from the County

The following items are available in either electronic or hard copy format from the County upon request for use in the design process:

- LCDOT Traffic Signal Specifications.
- LCDOT Mast Arm Mounted Street Name Sign Sheet.
- LCDOT Standard Traffic Signal Design Detail Sheets.
- Typical Pavement Markings for County Highways Sheets.
- Existing Traffic Signal Plans or Samples.

3. Plan Submittals

Two full-size sets of plans, specifications and cost estimate should be submitted along with the Checklist for Traffic Signal Plan Submittals (shown on page 3). After the first submittal, all subsequent submittals should include a letter with responses to review comments and the marked-up plans and specifications from the previous review.

4. Final Submittal

Upon final plan approval, the County will request the final plan submittal be made by the Consultant. The final plan submittal should include the following items:

- Checklist for Traffic Signal Plan Submittals (next page).
- One full-size reproducible (mylar) plan set, signed and sealed.
- Four full-size paper plan sets, signed and sealed.
- Four sets of specifications.
- Four copies of the Estimate of Cost, signed and sealed.
- CD containing MicroStation files for entire project. The names of the MicroStation files should include both of the street names at the intersection and the file type, for example:

01 Delany&Sunset to Grove CVR **Cover Sheet** Summary of Quantities 02 Delany&Sunset to Grove SUM 03 Delany&Ryan TMP Temporary Traffic Signal Plan Temporary Cable Plan 04_Delany&Ryan_TCB Traffic Signal Installation Plan 05 Delany&Ryan TSI Traffic Signal Modification Plan 05_Delany&Ryan_MOD Cable Plan 06_Delany&Ryan_CAB 07 Delany&Ryan SEQ Sequence of Operation Interconnect Plan 08 Delany&Sunset to Grove INT Interconnect Schematic 09 Delany&Sunset to Grove SCM Mast Arm Mounted Street Name Signs 10_Delany&Sunset to Grove_STN Video Transmission System Schematic 11 Delany&Sunset to Grove VID

5. Checklist

The Checklist on the following page should be completed and submitted with each plan submittal.

CHECKLIST FOR



TRAFFIC SIGNAL PLAN SUBMITTALS

SUBMITTED TO:	SUBMIT	TAL DA	TE:		JOB: PERMIT/COUNTY/FEDERAL
MAIN ROUTE: CROSS			T:		LIMITS OF
DESCRIPTION:					PROJECT:
THIS IS THE: 1st 2nd 3rd 4th	5th	or	Final	SUBMITTAL C	OF THIS PLANSET.
SIGNAL PROJECT/PLANSET IS:			Part of Ro	adway Improve	ment Planset
Stand Alone		Sepa	arate from	Roadway Impr	ovement Planset
DESIGN FIRM FOR TRAFFIC SIGNAL PLA	NS:				
Designed by: Drawn by	/ :			Checked by:	
DESIGN FIRM FOR ROADWAY IMPROVEN	MENT PL	ANS:			
THE FOLLOWING ITEMS ARE INCLUDED	WITH TH	IS SUB	MITTAL:		
Roadway Improvement Plans		IDOT District 1 Standard Traffic Signal Design Detail Sheets			
Signed and Sealed Cover Sheet		וטטו District ז Standard Traffic Signal Design Defail Sheets			
Signed and Sealed Cost Estimate			LCDOT	Standard Troffic	Signal Design Detail Shoots
Summary of Quantities Sheet		LCDOT Standard Traffic Signal Design Detail Sheets			
Mast Arm Mounted Street Name Signs		LCDOT Typical Payament Markings for County Highways Shoots			
Traffic Signal Specifications		LCDOT Typical Pavement Markings for County Highways Sheets			
Marked-up Plans from Previous Review		Letter Responding to Previous Review Comments			
Mylar Plans			CD Co	ntaining MicroS	tation Files for Entire Project
Yes No -	- An Inte	rsection	n Design S	Study has been	completed for this intersection.
Yes No -	- These F	Plans ar	e being s	ubmitted to IDO	T for review and comment.
Yes No -	Temporary Traffic Signals are required for these improvements.				
Yes No -	The Municipalities have been contacted regarding EVP equipment installation.				
Yes No	LCDOT has received a copy of this correspondence.				
Yes No -	Electric Company has been contacted regarding Service Installation.				
Yes No	Ī	LCDOT	has rece	ived a copy of th	nis correspondence.
Yes No -	No Telephone Company has been contacted regarding Phone Service.				
Yes No	Ī	LCDOT	has rece	ived a copy of th	nis correspondence.
OTHER:					

DESIGN GUIDELINES

1. Electric Service Installation

The designer shall contact the electric utility company regarding the electric service installation requirements or charges for the project. The County shall be copied on all written correspondence with the electric utility company. The name and phone number of the electric utility company representative shall be listed on the Cable Plan in the Wattage Calculation Table.

If a new electric service location is required for the project, the designer should meet with the representative of the electric utility company in the field to verify the proposed location for the electrical service.

If the total wattage for an existing traffic signal installation will be changing because of signal modifications, a copy of the new Wattage Calculation Table shall be sent to the electric utility company representative.

The cable for the electric service shall be brought into the cabinet foundation using a 2" conduit.

Either a Pole Mounted or a Ground Mounted Service Installation shall be specified for each new traffic signal.

2. Traffic Signal Heads

All new or modernized traffic signal installations shall utilize Light Emitting Diode (LED) signal heads. All traffic signal heads used in permanent signal installations shall be either bracket mounted or mast arm mounted and the material type shall not be specified.

All traffic signal sections shall have 12" lenses. All existing 8" lenses shall be removed and replaced.

All mast arm mounted signal heads require louvered backplates.

3. Traffic Signal Head Placement

A minimum of three signal heads for through traffic shall be provided on the far side of the intersection.

At least one, and preferably two, of the signal faces required on the far side shall be located between two lines intersecting with the center of the approach lanes at the stop bar, one making an angle of approximately 20 degrees to the right of the center of the approach extended and the other making an angle of approximately 20 degrees to the left of center of the approach extended.

If Mast Arms are proposed, two of the signal heads shall be mounted on the mast arm.

If more than one through-lane exists for an approach, each mast arm mounted signal head shall be mounted in the center of the corresponding through-lane.

See Appendix B for additional guidance on traffic signal head placement for various lane configurations.

4. Pedestrian Signal Heads

All new pedestrian signal heads shall display the international symbol for walk (walking person) and the international symbol for don't walk (raised palm) on the top section, and a countdown timer on the bottom section. Existing pedestrian signal heads that utilize text ("Don't Walk") shall be removed and replaced. All pedestrian signal heads shall be bracket mounted.

5. Pedestrian Push-Buttons

Pedestrian push-buttons shall be placed next to sidewalks or at locations convenient to crosswalks, according to current "Americans with Disabilities Act" (ADA) standards. Each push-button shall be shown on the Plan on the side of the mast arm or post where it is to be installed. Each pushbutton should be accompanied by a 5" x 7" sign, and the sign and its location shall also be shown on the Plan. See the General Example in Appendix B for proper pushbutton and sign placement.

Two pushbuttons per corner shall be provided when two walk phases are available at that corner. The pushbuttons shall be mounted on separate posts/mast arms, and shall be a minimum of 10 feet apart.

6. Video Detection System (Complete Intersection)

The Video Detection System (Complete Intersection) shall be called for in the plans on all new traffic signal installations and on some traffic signal modernizations, except when State or Federal funding is involved. The use of video detection in these cases shall be determined by the County Traffic Engineer.

Video detection cameras should be shown on all County temporary traffic signals, and the cost of the Video Detection System shall be incidental to the cost of the temporary traffic signal.

When installed on a permanent traffic signal installation, combination mast arms shall be used, and the video detection camera shall be located on the luminaire arm of the combination mast arm assembly. When installed on a temporary traffic signal installation, the camera shall be located on the wood pole.

Detection zones should be shown on the plans when video detection cameras are used. The detection zone should be nearly as wide as the lane that it is in, and about 35' long, when located just behind the stop bar. When located at far-back detection areas, the zone should cover nearly the entire travel-way for the oncoming lanes and be about 12' long.

If pavement marking for a turn-lane (arrow and "ONLY") is located within a proposed detection zone, the pavement marking should be removed and relocated to 50' behind the stop bar.

7. Remote-Controlled Video System

The Remote-Controlled Video System (PTZ Camera) shall be called for in the plans on all new traffic signal installations and on some traffic signal modernizations, except when State or Federal funding is involved. The use of the PTZ Camera in these cases shall be determined by the County Traffic Engineer.

The PTZ Camera shall be shown on all County temporary traffic signals, unless otherwise directed by the County Traffic Engineer, and the cost of the Remote-Controlled Video System shall be incidental to the cost of the temporary traffic signal.

The PTZ Camera shall be installed on the pole of the combination mast arm assembly and pole, and should be located in the intersection quadrant that will provide the most visibility for both of the intersecting streets. The designer should field check the lines-of-sight to determine the best location for the PTZ Camera.

8. Video Transmission System

The Video Transmission System allows the County to control the video detection cameras and PTZ camera(s) at an intersection or in a system via an ISDN connection. Either the Video Transmission System or the Layer III Switch shall be called for in the plans when video detection is used. The designer should assume the Layer III Switch will be used, unless otherwise directed by the County Traffic Engineer.

Only one Video Transmission System is necessary for each interconnected traffic signal system. The Video Transmission System should be located at the same location as the Master Controller, and an ISDN phone line should be provided in addition to the regular phone line for the master controller. Besides the ISDN phone line, there is no other plan symbology for the Video Transmission System.

In some instances, the County may wish to install the Video Transmission System in a cabinet other than the intersection traffic signal cabinet. When directed by the County Traffic Engineer, the Video Transmission System should be located in a Video Communications Cabinet. The Video Communications Cabinet should be shown on the plans next to the intersection traffic signal cabinet.

9. Layer III (Network) Switch

The Layer III Switch allows the County to control the video detection cameras and PTZ camera(s) at an intersection or in a system via fiber optic interconnect cable. Either the Layer III Switch or the Video Transmission System shall be called for in the plans when video detection is used. The designer should assume the Layer III Switch will be used, unless otherwise directed by the County Traffic Engineer.

One Layer III Switch can support up to seven Layer II Switches. If a system will have more than seven Layer II Switches, a second Layer III Switch should be considered for that system.

The Layer III Switch and the Terminal Server should be located at the same intersection.

The Layer III Switch shall always be installed in a Video Communications Cabinet. The Video Communications Cabinet should be shown on the plans next to the intersection traffic signal cabinet. There is no plan symbology for the Layer III Switch, but there is for the Video Communications Cabinet.

10. Layer II (Data Link) Switch

The Layer II Switch allows the County to control the video detection cameras and/or PTZ camera at an intersection via the Layer III Switch and fiber optic interconnect cable. The Layer II Switch shall be called for at all intersections in a traffic signal system in which a Layer III Switch is called for, unless otherwise directed by the County Traffic Engineer. The intersection where the Layer III Switch is located does not need a Layer II Switch.

At stand-alone intersections, the use of a Layer II Switch shall be determined by the feasibility of installing fiber optic interconnect cable to that intersection from the nearest Layer III Switch. This shall be determined by the County Traffic Engineer on a case-by-case basis.

There is no plan symbology for the Layer II Switch.

The Layer II Switch shall be installed in the intersection traffic signal cabinet, which may be Type IV or Type V, unless otherwise directed by the County Traffic Engineer.

11. Video Communications Cabinet

The Video Communications Cabinet shall be called for in the plans to house the Layer III Switch, and, in some instances, to house the Video Transmission System. The Video Communications Cabinet should be located next to the intersection cabinet in a manner that permits the doors of both cabinets to open completely.

12. Inductive Loop Detection

On projects involving State or Federal funding, inductive loop detectors may be required. Please refer to IDOT District One's "Traffic Signal Design Guidelines" for guidance on inductive loop detector design.

On County projects where existing loop detectors are being replaced with video detection, the far back loops on each approach may be retained as sampling loops and shall be combined on one lead-in cable.

13. Emergency Vehicle Preemption Detection

Emergency Vehicle Preemption shall be installed for all new intersections, unless otherwise directed by the local agency. Under most conditions, a bi-directional light detector assembly will be adequate. Where mast arms are present, the detector shall be placed on the mast arm two feet to the right of the far left mast arm mounted signal. On intersection approaches which do not have mast arms, the designer shall field check the line-of-sight to determine the best location. Emergency vehicle light detectors must be mounted on 18-foot posts where mast arm mounting is not available. At larger intersections with dual left turn lanes, wide

medians, and/or three through-lanes, the detectors should be split. A separate light detector will be required for each approach.

Confirmation beacons must be provided for each direction of emergency vehicle detection.

The designer shall ensure that appropriate pay items are included in the plans (i.e., LIGHT DETECTOR, LIGHT DETECTOR AMPLIFIER). The pay item LIGHT DETECTOR AMPLIFIER shall be paid for on a basis of one each per intersection controller and shall provide operation for all movements required in the preemption phase sequence.

14. Controllers

Actuated solid state digital controllers meeting the latest NEMA standards housed in a Type IV or Type V cabinet shall be specified for all new intersections, and where appropriate for modernized or modified intersections. The pay item "FULL-ACTUATED CONTROLLER AND TYPE IV (or V) CABINET" shall be specified for these intersections.

The pay item "FULL-ACTUATED CONTROLLER AND TYPE V CABINET" shall be specified for all intersections that include a local controller and master controller.

The designer will be responsible for ensuring controller and master controller compatibility with existing equipment in the vicinity of the proposed design. In addition, the designer will be responsible for keeping abreast of the District's approved signal system manufacturers and their limitations (i.e., maximum number of system loops per master, maximum number of system loops per local, maximum number of controllers per master, maximum number of system loops per local, maximum number of controllers per master, special telemetry requirements for large systems, etc.)

15. Signal Posts

Traffic signal posts shall be galvanized steel.

All traffic signal posts should be placed a minimum of four feet behind the back of a barrier curb, or, If barrier curb does not exist, the post should be placed a minimum of ten feet behind the edge of pavement or two feet behind the edge of shoulder, whichever distance is greater.

The following post heights should be used with bracket mounted traffic signal heads and other post mounted equipment:

- 3-Section Head 16' post.
- 4-Section Head 16' post.
- 5-Section Head 16' post.
- Emergency Vehicle Preemption Light Detector 18' post.
- Optically Programmed Signal Head 18' post.
- Pedestrian Signal Head or Pushbutton only 10' post.

For new installations, decorative posts shall be used. The County has special pay item numbers assigned for the decorative posts. See page 18.

16. Mast Arm Assemblies and Poles

Combination Mast Arm Assemblies and Poles shall be used at installations when video detection cameras are being installed.

All mast arm poles shall be located at a minimum of six feet behind the back of barrier curb, or, if barrier curb does not exist, the mast arm poles shall be located at a minimum of ten feet behind the edge of pavement or two feet behind the edge of shoulder, whichever distance is greater.

Steel mast arm poles shall be located to utilize a fourteen to fifty-five foot mast arm assembly. The mast arm lengths shall be in two foot, even increments up to fifty-four feet (i.e. -14', 16', ... 52', 54', 55'). The outer traffic signal head on a steel mast arm assembly is to be placed two feet in from end of the mast arm.

For new installations, decorative mast arms shall be used. The County has special pay item numbers assigned for the decorative posts. See page 18.

17. Handholes

All handholes shall be cast in place utilizing IDOT Standards 814001 and 814006.

A double handhole shall be specified when eighteen or more cables enter a handhole and next to each controller cabinet.

A handhole is required when there is a change in direction of any conduit run that is 90° or more. Conduit runs with a change in direction of 90° or less, but that occur over a long distance (i.e., large radii) may not require a handhole.

Heavy-duty handholes shall be specified at all locations where vehicles could potentially drive over them, such as in the pavement or adjacent to shoulders.

Heavy-duty handholes shall only be designed in the pavement when it is necessary to service inside lane loops. Up to two lanes of detection can be serviced from a handhole outside the pavement area, and this is preferred to placing a heavy-duty handhole in the pavement. Heavy-duty double handholes are not allowed.

Interconnect handholes should be located as close to the right-of-way line as possible. Cross sections must be analyzed to ensure proper placement of interconnect handholes (i.e. outside drainage ditches).

The maximum spacing for interconnect handholes is 300 feet when copper conductor cable is used and 600 feet when fiber optic cable is used.

18. Conduit in Ground

All conduit shall be specified as conduit in ground, meaning it is not specified as pushed or trenched.

All conduit shall be galvanized steel with the exception of the low voltage detector raceway located between the pavement and adjacent handholes, which should utilize plastic unit duct.

The telephone service cable shall have its own conduit entering the controller foundation directly. If the telephone service cable will be routed through the double handhole adjacent to the controller foundation, it shall be installed in a one inch unit duct through the double handhole to reduce electrical interference from the electrical cables in the handhole.

The electrical service cable shall have its own conduit entering the controller foundation directly.

The following conduit sizes shall be used:

SIZE
3"
2 ½"
2 ½"
2"
2"
(2) 4"
4"
(2) 4"
2"
2"
2"
1"

CONDUIT ESTIMATION PROCEDURE

1. Find cable factor for each cable in conduit for which size is to be determined:

CABLE	FACTOR
#14, 2C	1.00
#14, 3C	1.08
#14, 5C	1.64
#14, 7C	1.80
Fiber Optic Cable, No. 62.5/125 24F	1.80
Fiber Optic Cable, No. 62.5/125 36F	2.00
#2, 2C	4.00
#4, 2C	3.00
#6, 2C	2.00
3 Pair, #18	1.64
6 Pair, #18	2.37
#20, 3C	0.50
#14, 1C	0.60
#10, 1C	0.50
#6, 1C	1.00
2-1C, #10	1.00
#16, 5 ½ Pair	1.80
#14, 3C, Railroad	1.08
Coaxial Cable	1.50

- 2. Add together the factors for all cable in the conduit.
- 3. Add 1.00 to the sum from Step 2 to get the Total.
- 4. Using the Total found in Step 3, find the conduit size using the chart below:

<u>TOTAL</u>		CONDUIT SIZE
New Signal Or Modify 40% Full	Add Pedestrian or Preemption 50% Full	
1.0 – 3.0	<3.750	1 1/4"
3.1 - 4.1	<5.125	1 ½"
4.2 - 6.8	<8.500	2"
6.9 - 9.7	<12.125	2 ½"
9.8 - 15.0	<18.750	3"
15.1 – 20.1	<25.125	3 ½"
20.2 - 25.9	<32.375	4"
26.0 - 40.7	<50.875	5"

5. Check conduit size found in Step 4 with the minimum sizes to be used for particular conditions and change to minimum size if size found in Step 4 is smaller.

<u>CONDUIT</u>	MINIMUM SIZE
Service Installation, Controller to RR Cabinet,	
Pedestrian Signal Post & Interconnect	2"
Signal Post or Regular Mast Arm Foundation	2 ½"
Combination Mast Arm Foundation	3"
Handhole to Controller & Main Conduit Crossings	4"

20. Electrical Cables

The following electrical cables shall be used:

ITEM 3-Section Signal Head 5-Section Signal Head Pedestrian Signal Head Pedestrian Pushbutton Video Detection Camera	<u>CABLE</u> No. 14, 5C No. 14, 7C No. 14, 3C No. 14, 2C No. 16, 6 Pair
PTZ Camera	No. 14, 3C, No. 20, 3C & Coaxial Cable
Luminaire	600V (EPR-Type RHW) 2-1/C No. 10
Detector Loop	No. 14, 1 Pair
Electric Service	No. 6, 2C
EVP Light Detector	No. 20, 3C, Twisted, Shielded
Confirmation Beacon	No. 14, 3C
L.E.D. Street Name Sign	No. 14, 2C
L.E.D. Blankout Sign	No. 14, 3C
Microwave Detector	No. 14, 2C
Railroad Interconnect	No. 14, 3C
Interconnect	24 Fiber or 36 Fiber
Tracer Cable	No. 14, 1C
Video Communications Cabinet	24 Fiber or 36 Fiber,
(for Video Transmission System)	No. 6, 2C &
	Coaxial Cable
Video Communications Cabinet (for Layer III Switch)	24 Fiber or 36 Fiber & Ethernet Cable

22. Electrical Cable Slack

The following slack and vertical lengths shall be used when calculating cable lengths:

<u>ITEM</u>	<u>SLACK</u>
Handhole	6.5
Double Handhole	13'

<u>ITEM</u>	<u>VERTICAL</u>
Foundations	3.5'
Mast Arm Mounted Item	20' + length on arm
Bracket Mounted Traffic or Pedestrian Signal Head	13'
L.E.D. Blankout Sign on Signal Post	18'
EVP on Signal Post	18'
Pedestrian Pushbutton	4'
Electric Service	13.5'
Luminaire	45'
Video Detection Camera	45'
PTZ Camera	40'

23. Foundations

The following foundation types and depths shall be used for concrete foundations:

<u>ITEM</u>	<u>TYPE</u>	<u>DEPTH</u>
Signal Posts	Type A	4'
Controller Cabinet and Video Communications Cabinet	Type D	4'
Controller Cabinet with UPS attached	Type D (Special)	4'
Non-combination mast arms less than 40' long	Type E (30")	15'
All other mast arms and combination mast arms	Type E (36")	15'

24. Temporary Traffic Signals

The installation of temporary traffic signals at locations with existing traffic signals is required in most cases where the existing signal equipment is being disrupted by construction or where the staging of traffic reduces visibility of the existing signals. These are not the only two cases where temporary signals may be required, though.

When existing traffic signal equipment is being only minimally disrupted and the designer feels that modifications to these signals can be accomplished without the use of temporary signals, the designer must first obtain approval from the County Traffic Engineer to proceed with a design that does not utilize temporary traffic signals.

The temporary traffic signal shall be designed to mimic the operation and phasing of the existing traffic signal, when present.

When designing temporary pole layout, the designer shall take into consideration existing and proposed geometrics, R.O.W. limits, construction staging, ground contours and drainage.

A minimum of three signal heads shall face traffic on each approach. One of these heads shall be a near right signal head. When protected only left-turn phasing is required, a minimum of five signal heads are required for that approach. Two signal heads shall be for the left turn movement, displaying red, yellow, and green left-turn arrows, and a "LEFT ON GREEN ARROW ONLY" sign shall be placed between these heads.

When temporary signals are being installed where there is an existing interconnect system, the designer shall ensure that this system is maintained during operation of the temporary signal.

Video Detection should be used for most temporary signals. The use of PTZ Cameras will be decided by the County Traffic Engineer on a case-by-case basis. Video detection cameras and PTZ cameras, when used, may be relocated from the existing traffic signal installation to the temporary traffic signal installation, or from the temporary traffic signal installation. When relocating cameras from the temporary traffic signal installation. When relocating cameras from the temporary traffic signal installation to the permanent signal installation, the designer shall ensure that the cameras meet the minimum requirements of the latest County specifications.

If Video Detection is not used, Microwave Detection should be used. The use of Microwave Detection will be directed by the County Traffic Engineer.

Controllers and Master Controllers may also be relocated from existing to temporary to permanent signals, but shall be decided by the County on a case-by-case basis. EVP equipment shall not be relocated to or from the temporary signal. EVP equipment may be relocated from the existing signal to the permanent signal, however.

Construction staging and associated traffic staging may require two or more temporary traffic signal designs. Two separate temporary signal designs (on two separate sheets) shall be required when different phasing, signal displays, and number of signal heads are required for each stage of construction.

If temporary pedestrian signal heads will be used, push-buttons shall be required.

25. Mast Arm Mounted Street Name Signs

All new traffic signals shall include LED Mast Arm Mounted Street Name Signs.

Signs for street names should be provided on all mast arm poles. If a street has different names on each side of the intersection, two street name signs for each street name shall be provided. Each pair of signs, with the same name, shall be mounted back to back on the mast arm on the same side as the respective street names.

All street name sign designs shall be shown on the Mast Arm Mounted Street Name Sign sheet shown in Appendix C.

The first letter of each street name shall be 8-inch upper case, and each subsequent letter shall be 6-inch lower case. If the abbreviations for United States (US) or Illinois (ILL) are used, all letters for these shall be 8-inch upper case. The spacing between the words should be 6 inches, if possible, but may be reduced to 5 inches when spacing is critical. A minimum of 2½ inches shall be included between the word and the right and left edges of the sign.

LED signs shall be 4', 6' or 8' in length. Regular street name sign lengths are in 6-inch increments.

For LED street name signs, the preferred method for the sign design is to use Series D lettering for the street name on a one-line sign. If Series D lettering for the street name does not fit on a one-line sign, then Series C lettering should be used on a one-line sign. If Series C lettering for the street name does not fit on a one-line sign, a two-line sign can be used. The crossroad designation as to Street, Avenue, etc., should be spelled out on the second line, if there is space available.

The following abbreviations and lengths shall be used:

<u>EVIATION</u>	SERIES D	SERIES C
(Avenue)	12 4/8	10 0/8
(Boulevard)	19 3/8	18 0/8
(Court)	10 1/8	8 4/8
(Circle)	14 3/8	12 4/8
(Drive)	10 6/8	9 1/8
(Highway)	20 5/8	17 1/8
(Lane)	11 0/8	9 3/8
(Parkway)	26 7/8	21 0/8
(Place)	8 1/8	7 0/8
	(Boulevard) (Court) (Circle) (Drive) (Highway) (Lane) (Parkway)	(Avenue)12 4/8(Boulevard)19 3/8(Court)10 1/8(Circle)14 3/8(Drive)10 6/8(Highway)20 5/8(Lane)11 0/8(Parkway)26 7/8

Rd	(Road)	11 2/8	9 4/8
St	(Street)	10 1/8	8 4/8
Ter	(Terrace)	15 4/8	13 2/8
Tr	(Trail)	10 0/8	8 4/8
US	(United States)	12 2/8	10 1/8
ILL	(Illinois)	14 2/8	12 1/8

26. Pavement Marking

All designers shall adhere to the LCDOT Typical Pavement Marking Details included in Appendix C. Thermoplastic pavement marking shall be specified for all bituminous pavement. Pre-formed plastic pavement marking shall be specified for all concrete pavement.

27. Sidewalk

All sidewalks removed for construction purposes shall be replaced. Sidewalk landings and depressed curb ramps accessible to the disabled shall be placed at crosswalk locations in conformance with ADA Standards and should be shown on the Traffic Signal Installation/Modification sheet.

28. Maintenance Vehicle Landing Space

A landing space shall be provided for County vehicles in all new traffic signal installations. The landing space shall be located next to the traffic signal controller cabinet, shall be easily accessible from the roadway, and shall measure 10' x 14'. The landing space shall be shown and dimensioned on the plans. Ten feet of depressed curb shall also be provided adjacent to the landing space for easy vehicle access.

29. Street Lighting

Luminaires shall be installed for all new traffic signal installations and for some temporary traffic signals, to be determined by the County on a case-by-case basis.

If federal or state funding is involved in the project, luminaires may not be required. This shall be decided on a case-by-case basis by the County Traffic Engineer.

The pay items and plan symbology used by the County for street lighting are shown in Appendix C.

30. Traffic Control & Protection

Pay items for Traffic Control and Protection shall be included in every project. The designer shall be responsible for reviewing the traffic control and protection standards developed by IDOT for typical applications, and only those standards that are applicable to the project should be used. On roadway design projects, the traffic signal designer shall coordinate with the roadway designer with respect to the traffic control and protection pay items and standards that are specified for the project.

31. System Grounding of Traffic Signal Equipment

New permanent traffic signal installations shall include grounding. Traffic signal modifications or modernizations shall have grounding installed for any new post, mast arm or controller foundation, so long as the controller foundation is grounded.

A continuous equipment grounding conductor (NO. 6 1C) shall be installed in all conduits that contain traffic signal cabling, except conduits that contain only detector loop lead-in cable or only interconnect cable. The equipment grounding conductor is paid for Electric Cable in Conduit, Grounding NO. 6 1C.

The equipment grounding conductor and associated ground rods shall be shown on the Cable Plan. Ground rods are required for all post, controller, and mast arm foundations. The ground rods are included in the cost of the foundation.

32. Traffic Signal Interconnect Systems

All new or modernized closed loop traffic signal systems shall utilize 24 fiber optic cable, 12 fibers shall be multimode and 12 fibers shall be single mode. At some locations, the use of 36 fiber optic cable may be desired. 24 fibers shall be multimode and 12 fibers shall be single mode.

A separate transceiver is required for each new controller that is being installed in an interconnected system.

For existing systems that are being expanded or modernized, the designer shall determine if the existing master controller is capable of accommodating the additional intersection(s). Depending on the size and configuration of the existing signal system, it may be necessary to provide an additional telemetry channel(s) in the master controller.

A tracer cable, No. 14 1C, shall be installed with the fiber optic interconnect cable.

For existing systems which utilize twisted pair cable that require modification, either 3 pair or 6 pair, NO. 18, communication cable shall be utilized for the interconnect. This type of interconnect is often referred to as a "copper" interconnect.

33. Railroad Coordination/Preemption

The designer should always contact LCDOT and request a meeting prior to beginning a design involving a railroad crossing within 200 feet of a traffic signal and/or when the existing or projected vehicular queue will extend beyond the crossing. Consideration must first be given to whether railroad preemption is required. This determination shall be made based on current County traffic signal design criteria, guidelines contained in the Institute of Transportation Engineers (ITE) publication "Preemption of Traffic Signals at or Near Railroad Grade Crossings with Active Warning Devices," and Illinois Commerce Commission (ICC) recommendations. An evaluation must be made of the probability of vehicles queuing onto the tracks during normal signal operation.

Based on the distance between the railroad tracks and the cross street, pre-signals may be required. The preferred mounting location for the pre-signals is on the railroad cantilever, if

present. The structural adequacy of the cantilever must be evaluated to determine if the cantilever is capable of accommodating the pre-signal.

The design shall incorporate internally illuminated LED left-turn and right-turn restriction signs. Two signs that display the international turn restriction shall be included for each turning movement to be restricted. If the signs are mounted on a post, the posts shall be at least one foot tall. These signs are not required for protected only left turn movements.

A phone drop must be included to the traffic signal controller cabinet unless the traffic signal installation is part of a signal system.

When a project involves work adjacent to a railroad, pay items for "Railroad Protective Liability Insurance" and "Right of Entry Permit" shall be included in the plans.

Please refer to IDOT District One's "Traffic Signal Design Guidelines" for further guidance on the design of traffic signals in close proximity to railroad grade crossings.

UNIQUE LCDOT CODED PAY ITEMS

CODE NO.	ITEM	UNIT
1004020	CONDUIT IN GROUND, 2" DIA., GALVANIZED STEEL	FOOT
1004021	CONDUIT IN GROUND, 2 1/2" DIA., GALVANIZED STEEL	FOOT
1004022	CONDUIT IN GROUND, 3" DIA., GALVANIZED STEEL	FOOT
1004023	CONDUIT IN GROUND, 4" DIA., GALVANIZED STEEL	FOOT
1004024	CONDUIT IN GROUND, 5" DIA., GALVANIZED STEEL	FOOT
LC000008	ENGINEER'S FIELD OFFICE, TYPE A (MODIFIED)	CAL MO
LC000022	TRAFFIC CONTROL AND PROTECTION	L SUM
LC000335	L.E.D. INTERNALLY ILLUMINATED STREET NAME SIGN	EACH
LC000336	SIGNAL HEAD, L.E.D., 2-FACE, 5-SECTION, BRACKET MOUNTED	EACH
LC000337	PEDESTRIAN SIGNAL HEAD, L.E.D., 1-FACE, BRACKET MOUNTED	
	WITH COUNTDOWN TIMER	EACH
LC000338	PEDESTRIAN SIGNAL HEAD, L.E.D., 2-FACE, BRACKET MOUNTED	
	WITH COUNTDOWN TIMER	EACH
LC000352	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION)	EACH
LC000353	REMOTE-CONTROLLED VIDEO SYSTEM	EACH
LC000355	VIDEO TRANSMISSION SYSTEM	EACH
LC000407	ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR	FOOT
LC000411	TRAFFIC SIGNAL POST 10 FT. (SPECIAL)	EACH
LC000412	TRAFFIC SIGNAL POST 16 FT. (SPECIAL)	EACH
LC000413	TRAFFIC SIGNAL POST 18 FT. (SPECIAL)	EACH
LC000414	RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)	EACH
LC000415	RIGHT OF ENTRY PERMIT	L SUM
LC000468	TERMINATE FIBER IN CABINET	EACH
LC000469	SPLICE FIBER OPTIC CABLE IN CABINET	EACH
LC000500	LAYER II (DATA LINK) SWITCH	EACH
LC000501	LAYER III (NETWORK) SWITCH	EACH
LC000404	VIDEO COMMUNICATIONS CABINET	EACH
LC000502	RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM	EACH
LC000503	RELOCATE EXISTING SWITCH	EACH

OBSCURE IDOT CODED PAY ITEMS USED BY LCDOT

81700215	ELECTRIC CABLE IN CONDUIT, 600V (EPR-TYPE RHW) 2-1/C NO. 10	FOOT
82103250	LUMINAIRE, SODIUM VAPOR, HORIZONTAL MOUNT,	
	PHOTO-CELL CONTROL, 250 WATT	EACH
87704	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE FT. (SPECIAL)	EACH
XX003661	ELECTRIC CABLE IN CONDUIT, COAXIAL	FOOT
X0300739	UNINTERRUPTIBLE POWER SUPPLY	EACH
X0322929	CAMERA MOUNTING ASSEMBLY	EACH
X0329851	FIBER OPTIC PATCH PANEL	EACH

1. General

Each sheet in the plans shall include and/or shall follow the following:

- Border.
- Design firm's name, address, telephone number and fax number.
- Sheet number block.
- Title block (except cover sheet).
- Sheet size shall be 24" high by 36" wide.
- North arrows, which should be oriented consistently throughout the plans, should be pointed up or to the right.
- Match lines shall be used when segments of roadway must be broken up on the plan sheets (break lines are not allowed).
- Minimum lettering size may be as small as 0.10 inches if capital letters are used.
 Titles and Phase Designation Diagrams must have 0.15 inch or larger lettering.

The designer shall have a thorough understanding of Chapter 63 of IDOT's "Bureau of Design and Environment Manual."

All plan-sets shall be submitted with sheets in the following order:

Cover Sheet.

Summary of Quantities.

Temporary Traffic Signal Plan (If required).

Temporary Cable Plan (If required).

Traffic Signal Installation or Modification Plan.

Cable Plan, Schedule of Quantities & Phase Designation Diagram.

Normal Sequence of Operation, Railroad Preemption Sequence of Operation & Emergency Vehicle Preemption Sequence of Operation (If required).

Interconnect Plan.

Interconnect Schematic & Schedule of Quantities.

Mast Arm Mounted Street Name Signs.

Video Transmission System Schematic.

LCDOT Standard Traffic Signal Design Detail Sheets.

Typical Pavement Markings for County Highways Sheets.

District One Standard Signal Design Detail Sheets.

(See Appendix C for examples.)

2. Cover Sheet

A Cover Sheet is required for all projects, and shall include:

- Designer name and phone number in the left side margin.
- Sheet number block.
- Index of Sheets.
- Location map.

Signature block for Engineer's seal.

3. Summary of Quantities

A Summary of Quantities is required for all improvement projects, and shall include:

- The Summary of Quantities sheet shall list items in pay item Code Number sequence, with the full pay code item description. Each item shall be broken into sub-quantities per location and function. The amount of sub-quantity to be paid for by each participating Agency shall be listed. The total quantity shall match the balance of the sub-quantities.
- The body of the quantities should be in capital letters and include: CODE NUMBER, UNIT, ITEM, and QUANTITY. Items shall be in exactly the same Code Number order as on the Estimate of Cost pages or schedule.

4. Temporary Traffic Signal Plan

When temporary traffic signals are required, the Temporary Traffic Signal Plan shall include:

- North arrow and scale of 1" = 20'.
- Notes for Temporary Traffic Signals.
- Temporary Traffic Signal Legend.
- Existing Equipment to be Removed Legend.
- Remove Existing Traffic Signal Equipment Notes.
- Existing and proposed geometrics.
- Existing traffic signal equipment.
- Temporary traffic signal equipment.
- Traffic Signal Equipment Data.
- Dimensioned pole locations.
- Pole guy wire locations.
- Lane width dimensions and ROW dimensioned from centerline of roadway.
- Construction Notes (if necessary).

5. Temporary Cable Plan

When temporary traffic signals are required, the Temporary Cable Plan shall include:

- North arrow.
- Temporary Cable Plan.
- Temporary Phase Designation Diagram.
- Temporary Emergency Vehicle Preemption Sequence.
- Temporary Cable Plan Legend.
- Wattage Calculation Table.

6. Traffic Signal Installation or Modification Plan

The Traffic Signal Installation or Modification Plan shall include:

- North arrow and scale of 1" = 20'.
- Proposed geometrics.
- Proposed and existing (if applicable) traffic signal equipment and callouts.
- Construction Notes (if necessary).
- Traffic Signal Legend.
- Remove Existing Traffic Signal Equipment Notes (if no temporary traffic signal plans).
- Traffic Signal Equipment Data.
- Lane width dimensions and ROW dimensioned from centerline.
- Pedestrian sign types and locations.

7. Cable Plan, Schedule of Quantities & Phase Designation Diagram

The Cable Plan shall include:

- North arrow.
- Cable Plan.
- Phase Designation Diagram.
- Emergency Vehicle Preemption Sequence.
- Cable Plan Legend.
- Wattage Calculation Table.
- Schedule of Intersection Quantities.

8. Interconnect Plan

The Interconnect Plan shall include:

- North arrow and scale of 1"=50".
- Proposed geometrics.
- Proposed and existing (if applicable) traffic signal equipment and callouts.
- Construction Notes (if necessary).
- Interconnect Plan Legend.
- Traffic Signal Equipment Data.
- ROW dimensioned from centerline.

9. Interconnect Schematic and Schedule of Quantities

The Interconnect Schematic shall include:

- North arrow.
- Interconnect Schematic Legend.
- Schedule of Interconnect Quantities.
- Construction Notes (if necessary).

10. Other Sheets

 Mast Arm Mounted Street Name Signs – Shall be included on every project that involves new mast arms.

- Video Transmission System Schematic Shall be included on every project that involves proposed or existing video detection.
- LCDOT Standard Traffic Signal Design Details Shall be included on every project.
- Typical Pavement Markings for County Highways Sheets Shall be included on every project that involves proposed pavement markings.
- District One Standard Signal Design Details Shall be included on every project.

11. Specifications and Traffic Control and Protection

- The most recent version of the LCDOT Traffic Signal Specifications, including Traffic Control and Protection, shall be included with every submittal.
- Any additions to the Specifications must be approved by the County Traffic Engineer before approval of the plans is given.

12. Estimate of Cost

- An Engineer's Estimate of Cost shall be included with every submittal.
- The Estimate should be printed on 8 ½" x 11" sized paper.
- Estimate should include Coded Pay Item Number, Item Description, Unit Price and Total Price for each pay item shown on the Summary of Quantities. The total cost of the project should be shown at the end of the Estimate.
- Final Estimate should be signed and sealed by the Consulting Engineer.
- See Appendix C for example.

APPENDIX A

LEGENDS

NOTES FOR TEMPORARY TRAFFIC SIGNALS

- All Control Equipment including emergency pre-emption and communication devices for the temporary traffic signal(s) shall be furnished by the Contractor.
- 2. Only Econolite controllers supplied by one of the County approved closed loop equipment manufacturers will be approved for use at temporary signal locations. All controllers used for temporary traffic signals shall be fully-actuated NEMA microprocessor based with RS232 data entry ports compatible with existing monitoring software approved by the County installed in a NEMA TS1 or TS2 cabinet.
- 3. All traffic signal sections and pedestrian signal sections shall be 12". Heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Engineer. The Contractor shall furnish enough cable slack to relocate heads to any position on the span wire for construction staging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cable from the controller cabinet to the signal head.
- 4. All existing street name and intersection regulatory signs shall be removed from existing poles, relocated, and securely fastened to the signal span wire or wood pole as directed by the Engineer.
- 5. Any temporary signal within an existing closed loop traffic signal system shall be interconnected to that system. Any temporary traffic signal within an ICONS sytem shall be NTCIP compatible and shall be interconnected to that system.
- 6. If no traffic staging is in place or will not be staged on the day of the turn-on, the temporary traffic signal shall have the signal head displays, signal head placements, and controller phasing match the existing traffic signal at the time of the turn-on.

Remove Existing Traffic Signal Equipment Each 1

The following existing traffic signal equipment shall be removed by the Contractor, shall remain the property of the County and shall be delivered by the Contractor to the County yard as per the traffic signal specifications or as directed by the County Traffic Engineer.

The following existing traffic signal equipment shall be removed by the Contractor and shall remain the property of the Agency listed below. The Contractor shall safely store and arrange for pick up or delivery of all equipment to be returned to the listed Agency as per the traffic signal specifications.

AGENCY:

The following items shall be removed by the Contractor and shall be disposed of by them outside the right-of-way at their expense. The salvage value of the removed equipment shall be reflected in the contract bid price.

EXISTING EQUIPMENT TO BE REMOVED LEGEND

″E″<	EXISTING SIGNAL HEAD TO BE REMOVED
"E"-	EXISTING SERVICE INSTALLATION TO BE REMOVED
"E" ○	EXISTING SIGNAL POST AND FOUNDATION TO BE REMOVED
	EXISTING MAST ARM POLE AND FOUNDATION TO BE REMOVED
″E″⊠	EXISTING CONTROLLER AND FOUNDATION TO BE REMOVED
"E"	EXISTING HANDHOLE TO BE REMOVED
"E"	EXISTING PEDESTRIAN SIGNAL HEAD TO BE REMOVED
′′E′′ ⊚	EXISTING PEDESTRIAN PUSHBUTTON TO BE REMOVED
″E″ ⊳	EMERGENCY VEHICLE LIGHT DETECTOR TO BE REMOVED
"E" D⊸	CONFIRMATION BEACON TO BE REMOVED
"E" ⊞	EXISTING HEAVY-DUTY HANDHOLE TO BE REMOVED

TEMPORARY TRAFFIC SIGNAL LEGEND

· ·	
—	TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED ORIGINAL LOCATION
	TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED SECONDARY LOCATION
\otimes	TEMPORARY WOOD POLE (CLASS 5 OR BETTER) 45 FOOT MINIMUM
\triangleright	TEMPORARY CONTROLLER CABINET
	TEMPORARY SPAN WIRE, TETHER WIRE, AND CABLE
\Box	TEMPORARY SERVICE INSTALLATION
•	TEMPORARY PEDESTRIAN SIGNAL HEAD, BRACKET MOUNTED
	VIDEO DETECTION CAMERA
	PTZ CAMERA
•	PEDESTRIAN PUSHBUTTON DETECTOR
>	EMERGENCY VEHICLE LIGHT DETECTOR
<u>}•</u>	CONFIRMATION BEACON
	VEHICLE DETECTOR, INDUCTION LOOP
UD	UNIT DUCT
	G.S. CONDUIT IN GROUND (CIG)
	HANDHOLE
H	HEAVY DUTY HANDHOLE
	MICROWAVE DETECTOR

TEMPORARY CABLE PLAN LEGEND

R	TEMPORARY	TRAFFIC	SIGNAL	SECTION
	OR PEDESTF	RIAN SIGNA	AL SECT	ION 12"

TEMPORARY CONTROLLER CABINET

TEMPORARY SERVICE INSTALLATION

INDICATES NUMBER OF CONDUCTORS
IN CABLE. ALL CONDUCTORS TO BE
NUMBER 14 AWG WIRE UNLESS OTHERWISE NOTED.

EMERGENCY VEHICLE LIGHT DETECTOR

CONFIRMATION BEACON

VEHICLE DETECTOR, INDUCTION LOOP

PEDESTRIAN PUSHBUTTON DETECTOR

PEDESTRIAN SIGNAL HEAD

VIDEO DETECTION CAMERA

PTZ CAMERA

LUMINAIRE

T TELEPHONE DROP

■ MICROWAVE DETECTOR

TRAFFIC SIGNAL LEGEND

	PROPOSED	EXISTING
CONTROLLER		
SERVICE INSTALLATION		ф
SIGNAL HEAD	-	>
SIGNAL HEAD WITH BACKPLATE	+	+
SIGNAL HEAD, PEDESTRIAN	-11	$-\Box$
SIGNAL POST	•	Ö
MAST ARM ASSEMBLY AND POLE, STEEL	•	0
MAST ARM ASSEMBLY AND POLE, ALUMINUM		0
COMBINATION MAST ARM ASSEMBLY AND POLE, STEEL, WITH LUMINAIRE	• <u>*</u>	0 <u>X</u> —
UNIT DUCT	UD	
CONDUIT SPLICE	-	
HANDHOLE		
HEAVY DUTY HANDHOLE	H	H
DOUBLE HANDHOLE		
G.S. CONDUIT IN GROUND (CIG)		
PEDESTRIAN PUSHBUTTON DETECTOR	•	0
PEDESTRIAN PUSHBUTTON SIGN	4	90
DETECTOR LOOP		00
EMERGENCY VEHICLE LIGHT DETECTOR	•	\sim
CONFIRMATION BEACON	••	0-0
SIGNAL HEAD OPTICALLY PROGRAMMED	→ "P"	—>"P"
RAILROAD CONTROL CABINET		P "E"
VIDEO DETECTION CAMERA		
APPROXIMATE DETECTION ZONE		
PTZ CAMERA		
STREET NAME SIGN	-	-0-
ABANDON	"A"	
COMBINATION CURB AND GUTTER REMOVAL AND COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24 (DEPRESSED CURB)		
P.C.C. SIDEWALK 5"		
BITUMINOUS SHOULDER REMOVAL AND P.C.C. SIDEWALK, 5"	277773	
VIDEO COMMUNICATIONS CABINET		EXC]"E"
TELEPHONE DROP	T	T

CABLE PLAN LEGEND

	CA	BLE PLAN LEGEND
EXISTING	PROPOSED	12" TRAFFIC SIGNAL SECTION
	6	12" PEDESTRIAN SIGNAL SECTION
00	00	12" PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER
\boxtimes		CONTROLLER CABINET
0	-	SERVICE INSTALLATION
T	T	TELEPHONE INSTALLATION
00		VEHICLE DETECTOR, INDUCTION LOOP
\bowtie	•	EMERGENCY VEHICLE LIGHT DETECTOR
D-0) —•	CONFIRMATION BEACON
0	•	PUSHBUTTON DETECTOR
2	2	DENOTES NUMBER OF CONDUCTORS. ALL CABLE NO. 14 EXCEPT AS INDICATED. ALL LOOP DETECTOR CABLE TO BE SHIELDED.
1	1	GROUND CABLE IN CONDUIT NO. 6 SOLID COPPER (GREEN)
24	29	FIBER OPTIC CABLE IN CONDUIT NO. 62.5/125 2-MM12F SM12F
(R) Y (G) (T) (F) (F) (F) (F) (F) (F) (F) (F) (F) (F	R Y G +-Y +-G	SIGNAL FACE WITH BACKPLATE. "P" INDICATES PROGRAMMED HEAD.
"E"RRR	RR	RAILROAD CONTROL CABINET
"E "	3	ILLUMINATED SIGN "NO LEFT TURN"
"E"		ILLUMINATED SIGN "NO RIGHT TURN"
H/C	C 11	GROUND ROD AT HANDHOLE (H), DOUBLE HANDHOLE (H), OR CONTROLLER (C)
P	P. 4	GROUND ROD AT POST (P) OR MAST ARM POLE (MA)
5	S	GROUND ROD AT ELECTRIC SERVICE INSTALLATION
X	(LUMINAIRE
		VIDEO DETECTION CAMERA
		PTZ CAMERA
"E" C C	ccc	VIDEO COMMUNICATIONS CABINET
		TELEPHONE DROP
ST. NAME	ST. NAME	L.E.D. STREET NAME SIGN
D. F. HAMILE	OTT TANKE	LILIO STREET NAME STON

INTERCONNECT PLAN LEGEND

	<u>PROPOSED</u>	EXISTING
CONTROLLER CABINET		
VIDEO COMMUNICATIONS CABINE	T 🔯	©~~~′′E′′′
HANDHOLE		
DOUBLE HANDHOLE		
HEAVY-DUTY HANDHOLE	H	H
G.S. CONDUIT IN GROUND (CIG)		=
DETECTOR LOOP		φ φ
SYSTEM	S	
INTERSECTION	IP	I
UNIT DUCT	UD	

INTERCONNECT SCHEMATIC LEGEND

	INTERSECTION CONTROLLER
c	VIDEO COMMUNICATIONS CABINET
	EXISTING INTERSECTION CONTROLLER
MC	MASTER CONTROLLER
EMC	EXISTING MASTER CONTROLLER
	PROPOSED INTERSECTION AND SAMPLING (SYSTEM) DETECTOR
· · · · · · · · · · · · · · · · · · ·	SAMPLING (SYSTEM) DETECTOR
-36-	PROPOSED INTERCONNECT CABLE NO. 62.5/125 24F MULTIMODE AND 12F SINGLE MODE
<u>-24</u>	PROPOSED INTERCONNECT CABLE NO. 62.5/125 12F MULTIMODE AND 12F SINGLE MODE
12	EXISTING INTERCONNECT CABLE NO. 62.5/125 12C FIBER OPTIC CABLE
<u>_6</u> _	PROPOSED INTERCONNECT CABLE NO. 18, 3 PAIR TWISTED, SHIELDED
6	EXISTING INTERCONNECT CABLE NO. 18, 3 PAIR TWISTED, SHIELDED
2	PROPOSED LOOP DETECTOR CABLE 2/C TWISTED, SHIELDED
2	EXISTING LOOP DETECTOR CABLE 2/C TWISTED, SHIELDED
$\cdots \underbrace{1}\cdots$	PROPOSED TRACER CABLE NO. 14 1/C
1	EXISTING TRACER CABLE NO. 14 1/C
ĬŤ:	EXISTING TELEPHONE CONNECTION
T	PROPOSED TELEPHONE CONNECTION
	PROPOSED ISDN CONNECTION

WATTAGE CALCULATION TABLE

L.C.D.O.T. TRAFFIC SIGNAL INSTALLATION ELECTRICAL SERVICE REQUIREMENTS						
TYPE	NO. OF LAMPS	WATI XINCAND.		< % OPERATION	WATTAGE	
SIGNAL (RED)	12	135	10	0.50	60.0	
(YELLOW)	12	135	19	0.10	22.8	
(GREEN)	12	135	11	0.40	52.8	
ARROW	8	135	9	0.10	7.2	
PED. SIGNAL	4	90	9	1.00	36.0	
CONTROLLER	1	-	100	1.00	100.0	
LUMINAIRE	2	-	250	0.50	250.0	
L.E.D. ST. NAME SIGN	3	ı	64	0.50	96.0	
VIDEO SYSTEM	1	_	150	1.00	150.0	
BATTERY BACKUP	1	1	25	1.00	25.0	

ENERGY COSTS TO:

STATE, COUNTY, MUNICIPALITY
OR PRIVATE AGENCY

DDRESS

STREET ADDRESS CITY, ILLINOIS ZIP

ENERGY SUPPLY: CONTACT: COMED REPRESENTATIVE

PHONE: (XXX) XXX-XXXX

COMPANY: COMED

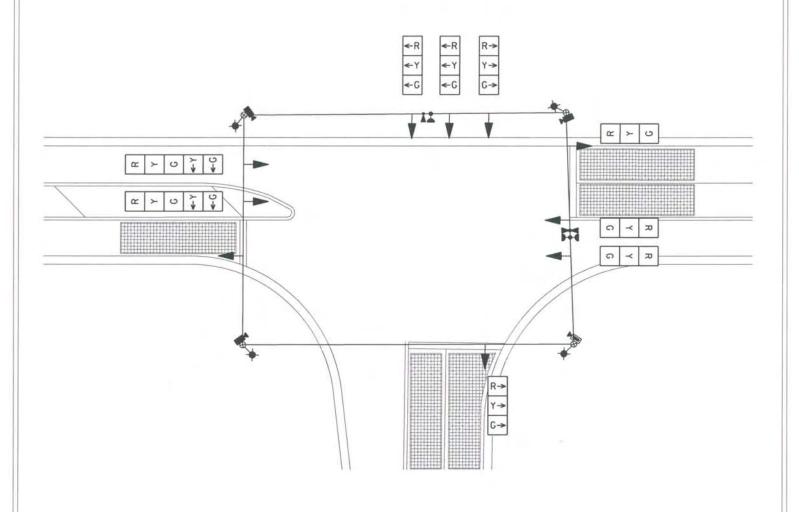
FOUNDATION (DEPTH)	FT.	CABLE SLACK	FT.	VERTICAL	FT.
TYPE A - POST	4	HANDHOLE	6.5	ALL FOUNDATIONS	3 . 5
D - CONTROLLER	4	DOUBLE HANDHOLE	13	MAST ARM (L) POLE	20'+
E - M. ARM POLE	15	SIGNAL POST	2		L-2=
		CONTROLLER CAB.	1	BRACKET MOUNTED	13
		FIBER OPTIC	13	PED. PUSHBUTTON	4
		ELECTRIC SERVICE	1	ELECTRIC SERVICE	13.5
		GROUND CABLE	1	SERVICE TO GROUND	13.5
				POST MOUNTED	6

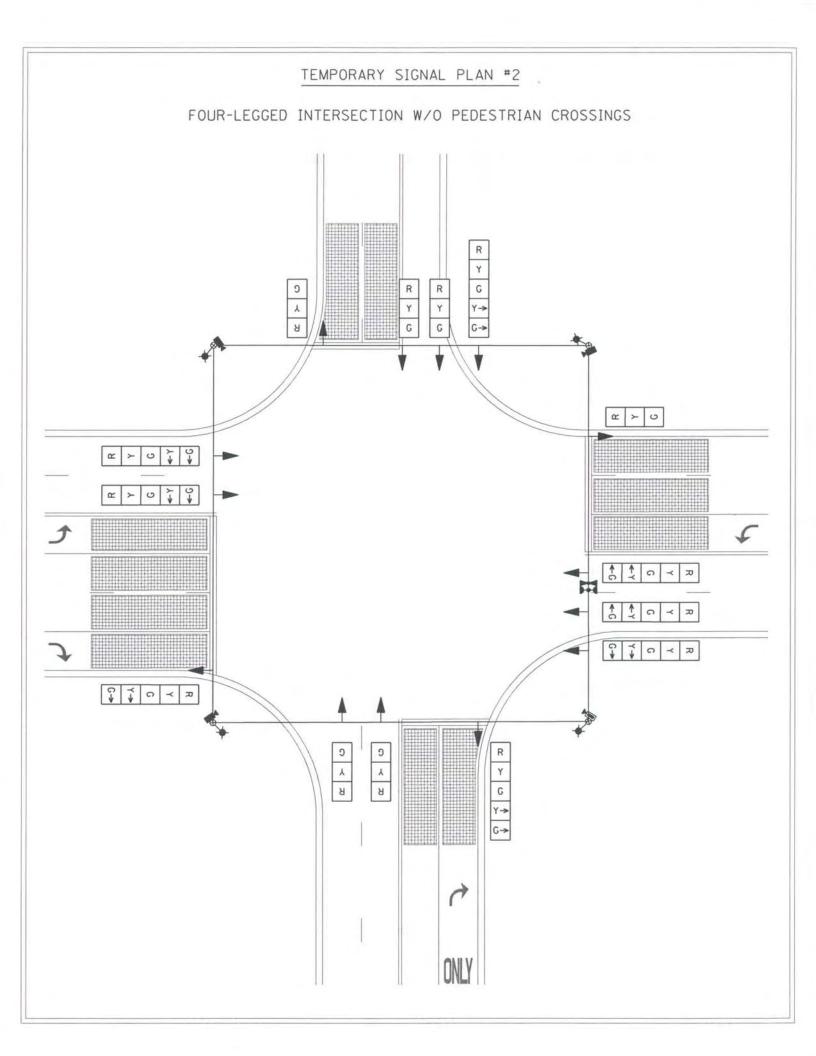
APPENDIX B

INTERSECTION DESIGN EXAMPLES

TEMPORARY SIGNAL PLAN #1

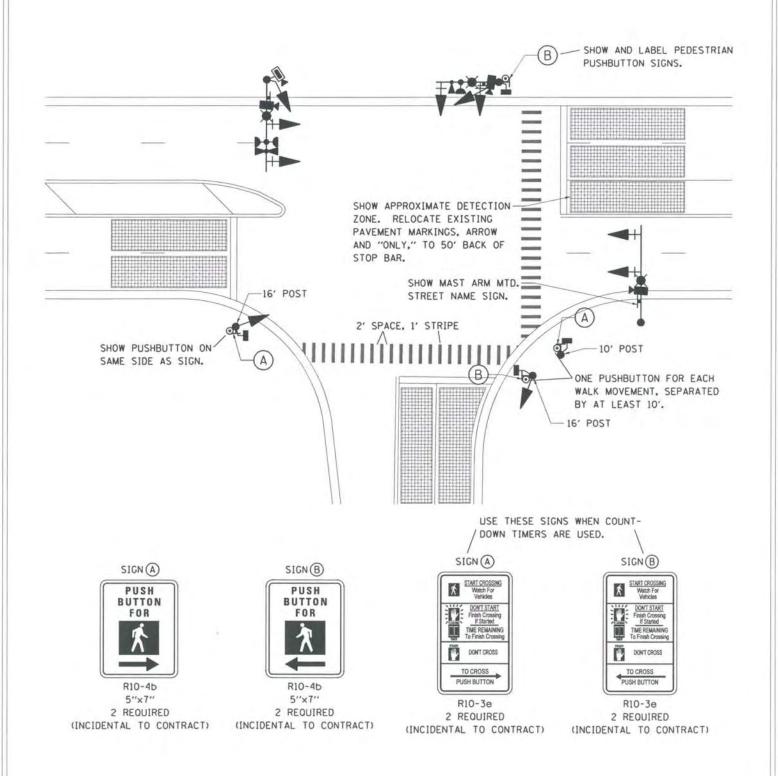
"T" INTERSECTION W/O PEDESTRIAN CROSSINGS





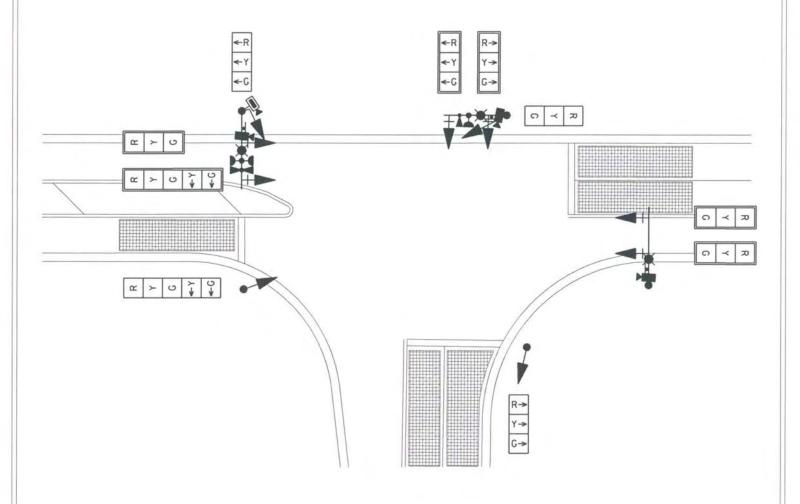
SIGNAL PLAN #1

GENERAL GUIDELINES

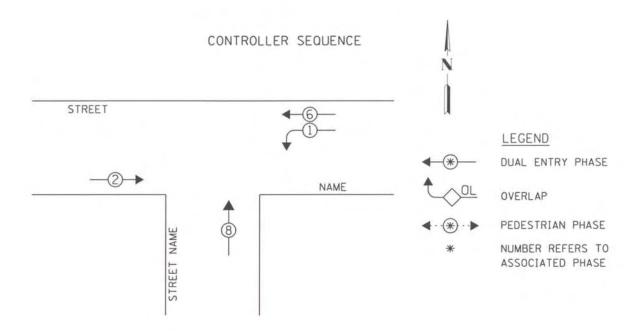


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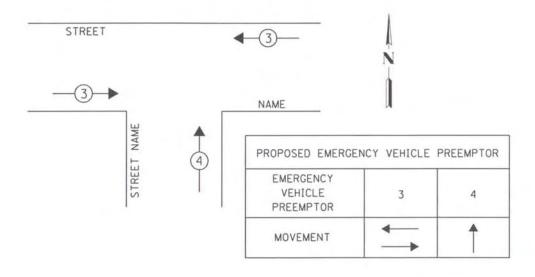
"T" INTERSECTION W/O PEDESTRIAN CROSSINGS



"T" INTERSECTION W/O PEDESTRIAN CROSSINGS

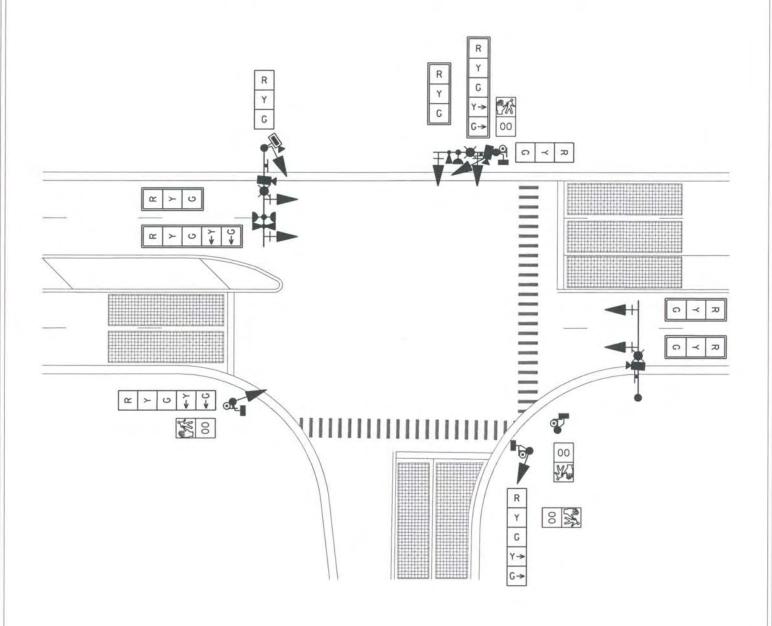


EMERGENCY VEHICLE PREEMPTION SEQUENCE

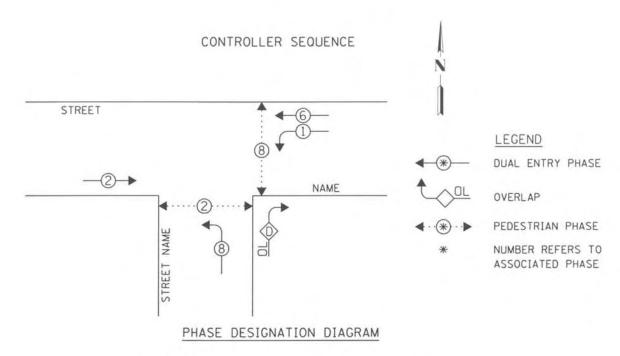


SIGNAL PLAN #3

"T" INTERSECTION WITH PEDESTRIAN CROSSINGS



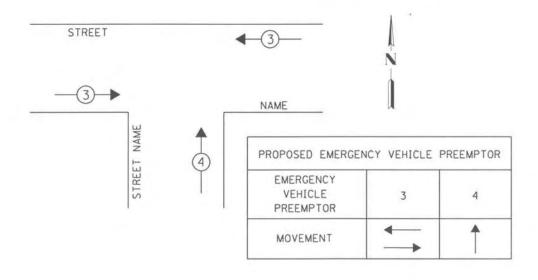
"T" INTERSECTION WITH PEDESTRIAN CROSSINGS

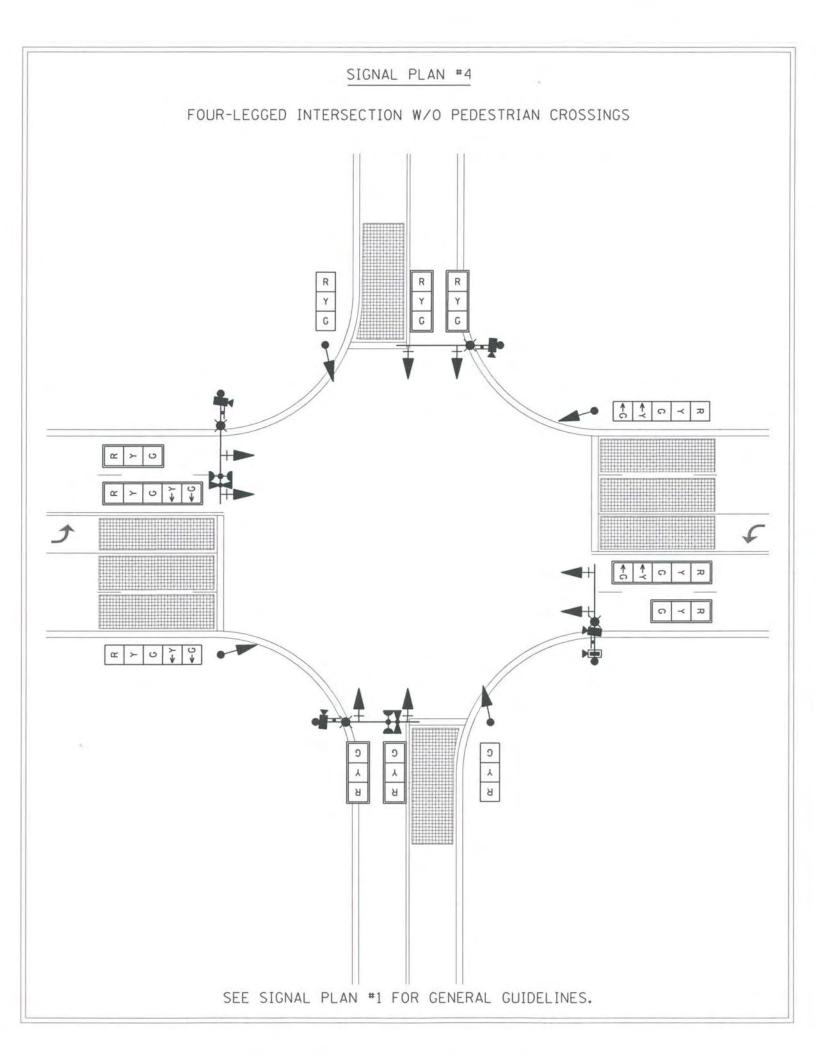


RIGHT TURN OVERLAP PHASE DESIGNATION

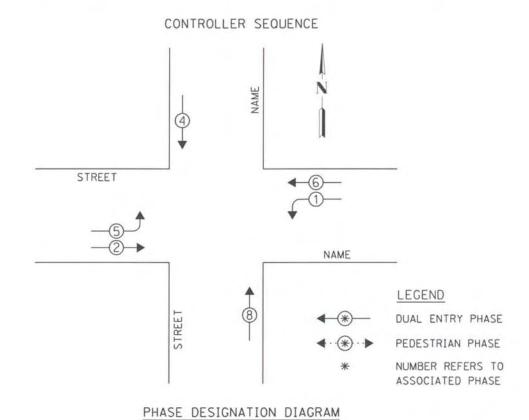
OVERLAP		PERMISSIVE		PROTECTED
LETTER		PHASE		PHASE
D	=	8	+	1

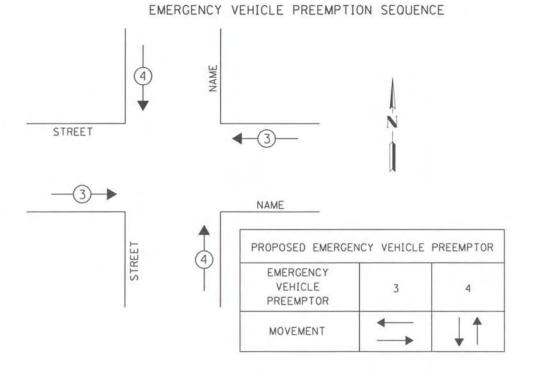
EMERGENCY VEHICLE PREEMPTION SEQUENCE

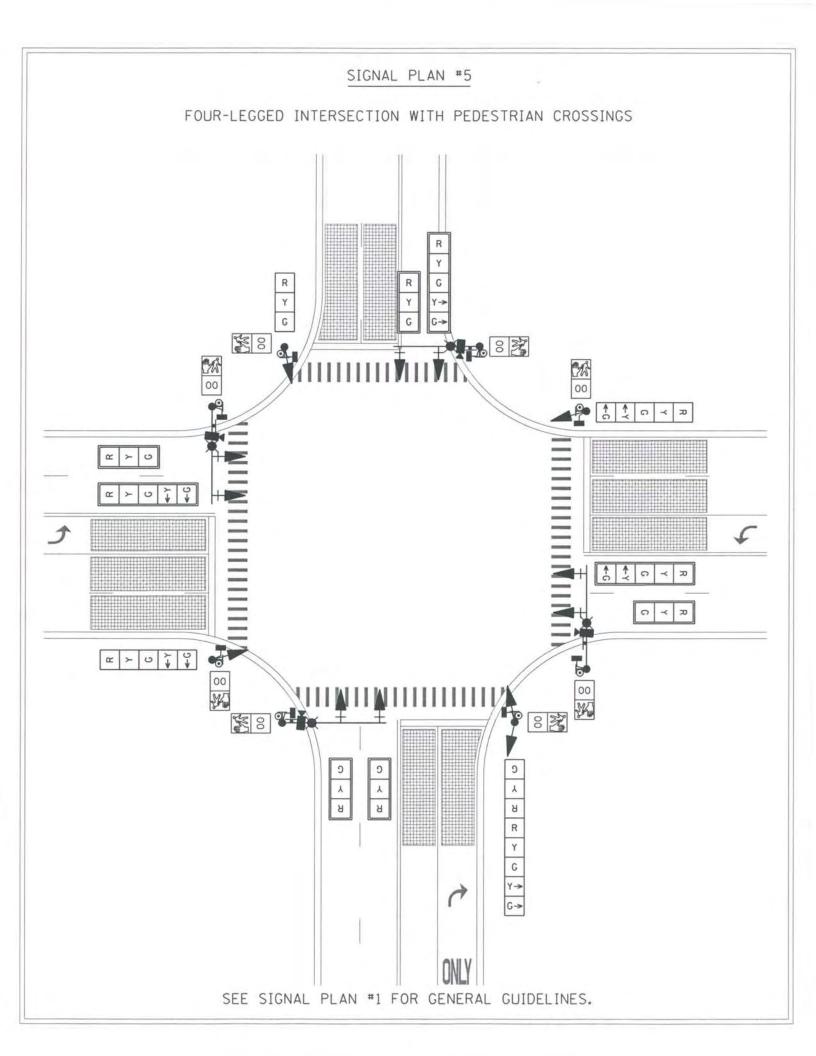




FOUR-LEGGED INTERSECTION W/O PEDESTRIAN CROSSINGS

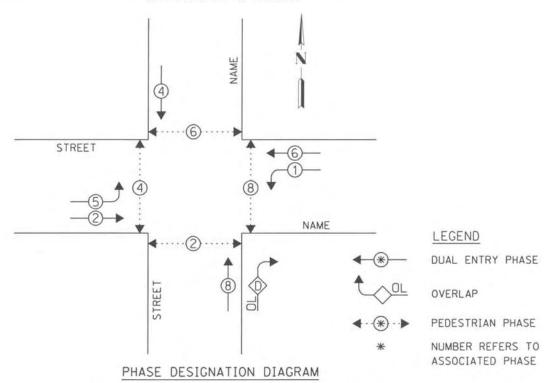






FOUR-LEGGED INTERSECTION WITH PEDESTRIAN CROSSINGS

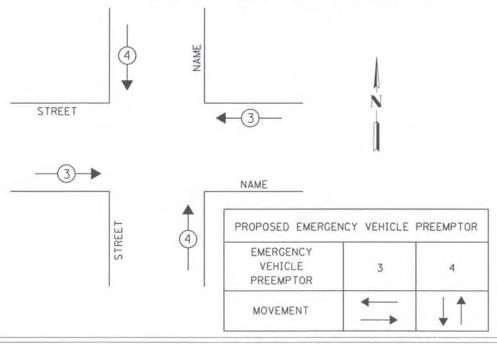
CONTROLLER SEQUENCE



RIGHT TURN OVERLAP PHASE DESIGNATION

-				
OVERLAP		PERMISSIVE		PROTECTED
LETTER		PHASE		PHASE
D	=	8	+	1

EMERGENCY VEHICLE PREEMPTION SEQUENCE



APPENDIX C

SAMPLE ESTIMATE OF COST, SIGNAL PLANS AND DETAIL SHEETS

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

CONSULTING FIRM NAME ADDRESS CITY, IL ZIP

APTAKISIC ROAD TRAFFIC SIGNAL IMPROVEMENTS LAKE COUNTY, ILLINOIS SHEET 1 OF 2

SHEET TOF	2			LINUT	
CODE NO.	ITEM	UNIT	QTY	UNIT PRICE	TOTAL
1004020	CONDUIT IN GROUND, 2" DIA., GALVANIZED STEEL	FOOT	2809	\$10.00	\$28,090.00
1004020	CONDUIT IN GROUND, 2 1/2" DIA., GALVANIZED STEEL	FOOT	86	\$12.00	\$1,032.00
1004022	CONDUIT IN GROUND, 3" DIA., GALVANIZED STEEL	FOOT	475	\$16.00	\$7,600.00
1004023	CONDUIT IN GROUND, 4" DIA., GALVANIZED STEEL	FOOT	220	\$21.00	\$4,620.00
42400200	PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH	SQ FT	1100	\$3.25	\$3,575.00
44000500	COMBINATION CURB AND GUTTER REMOVAL	FOOT	244	\$3.80	\$927.20
44001430	BITUMINOUS SHOULDER REMOVAL	SQ YD	48.8	\$20.00	\$976.00
60603900	COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.12	04.5	10.0	Ψ20.00	φονο.σσ
0000000	(ABUTTING EXISTING PAVEMENT)	FOOT	244	\$10.00	\$2,440.00
70101700	TRAFFIC CONTROL AND PROTECTION	L SUM	1	\$51,000.00	\$51,000.00
78000100	THERMOPLASTIC PAVEMENT MARKING - LETTERS AND SYMBOLS	SQ FT	327.6	\$2.50	\$819.00
78000600	THERMOPLASTIC PAVEMENT MARKING - LINE 12"	FOOT	1573	\$1.30	\$2,044.90
78000650	THERMOPLASTIC PAVEMENT MARKING - LINE 24"	FOOT	73	\$2.75	\$200.75
78300400	THERMOPLASTIC PAVEMENT MARKING REMOVAL	SQ FT	466.9	\$2.00	\$933.80
81400100	HANDHOLE	EACH	6	\$1,000.00	\$6,000.00
81400200	HEAVY-DUTY HANDHOLE	EACH	1	\$1,600.00	\$1,600.00
81700215	ELECTRIC CABLE IN CONDUIT, 600V (EPR-TYPE RHW) 2-1/C NO. 10	FOOT	3255	\$2.00	\$6,510.00
82103250	LUMINAIRE, SODIUM VAPOR, HORIZONTAL MOUNT,			V	**,******
	PHOTO-CELL CONTROL, 250 WATT	EACH	17	\$400.00	\$6,800.00
85000200	MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION	EACH	8	\$825.00	\$6,600.00
85700205	FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL	EACH	1	\$11,000.00	\$11,000.00
85700305	FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL	EACH	5	\$12,500.00	\$62,500.00
86400100	TRANSCEIVER - FIBER OPTIC	EACH	6	\$1,900.00	\$11,400.00
87301215	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 2C	FOOT	4590	\$0.80	\$3,672.00
87301225	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 3C	FOOT	5297	\$0.95	\$5,032.15
87301245	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 5C	FOOT	4291	\$1.05	\$4,505.55
87301255	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 7C	FOOT	3335	\$1.10	\$3,668.50
87704030	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 20 FT. (SPL)	EACH	1	\$13,500.00	\$13,500.00
87704070	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 28 FT. (SPL)	EACH	1	\$13,500.00	\$13,500.00
87704080	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 30 FT. (SPL)	EACH	4	\$13,800.00	\$55,200.00
87704090	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 32 FT. (SPL)	EACH	4	\$13,800.00	\$55,200.00
87704100	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 34 FT. (SPL)	EACH	3	\$13,800.00	\$41,400.00
87704120	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 38 FT. (SPL)	EACH	2	\$14,100.00	\$28,200.00
87704130	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 40 FT. (SPL)	EACH	1	\$14,100.00	\$14,100.00
87704180	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 50 FT. (SPL)	EACH	1	\$14,100.00	\$14,100.00
87800100	CONCRETE FOUNDATION, TYPE A	FOOT	20	\$145.00	\$2,900.00
87800400	CONCRETE FOUNDATION, TYPE E 30-INCH DIAMETER	FOOT	225	\$130.00	\$29,250.00
87800415	CONCRETE FOUNDATION, TYPE E 36-INCH DIAMETER	FOOT	30	\$150.00	\$4,500.00
87900200	DRILL EXISTING HANDHOLE	EACH	26	\$190.00	\$4,940.00
88200210	TRAFFIC SIGNAL BACKPLATE, LOUVERED, ALUMINUM	EACH	38	\$115.00	\$4,370.00
88500100	INDUCTIVE LOOP DETECTOR	EACH	13	\$150.00	\$1,950.00

Des	sign Engineer
	PPROVED
LAKE COUNTY DIVIS	SION OF TRANSPORTATION
DATE	20
7(1L	20
COLIN	TY ENGINEER

				UNIT	
CODE NO.	ITEM	UNIT	QTY	PRICE	TOTAL
88700200	LIGHT DETECTOR	EACH	8	\$750.00	\$6,000.00
88700300	LIGHT DETECTOR AMPLIFIER	EACH	4	\$1,600.00	\$6,400.00
88800100	PEDESTRIAN PUSH-BUTTON	EACH	32	\$165.00	\$5,280.00
89000100	TEMPORARY TRAFFIC SIGNAL INSTALLATION	EACH	1	\$35,000.00	\$35,000.00
89501400	RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM,				
	DETECTOR UNIT	EACH	1	\$725.00	\$725.00
89501410	RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM,				
	PHASING UNIT	EACH	1	\$1,100.00	\$1,100.00
89502200	MODIFY EXISTING CONTROLLER	EACH	1	\$2,000.00	\$2,000.00
89502300	REMOVE ELECTRIC CABLE FROM CONDUIT	FOOT	35109	\$0.50	\$17,554.50
89502375	REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT	EACH	7	\$1,200.00	\$8,400.00
89502380	REMOVE EXISTING HANDHOLE	EACH	2	\$275.00	\$550.00
89502385	REMOVE EXISTING CONCRETE FOUNDATION	EACH	20	\$260.00	\$5,200.00
LC000008	ENGINEER'S FIELD OFFICE, TYPE A (MODIFIED)	CAL MO	4	\$1,550.00	\$6,200.00
LC000205	SODDING (COMPLETE)	SQ YD	1200	\$30.00	\$36,000.00
LC000337	PEDESTRIAN SIGNAL HEAD, L.E.D., 1-FACE, BRACKET MOUNTED				
	WITH COUNTDOWN TIMER	EACH	8	\$1,250.00	\$10,000.00
LC000338	PEDESTRIAN SIGNAL HEAD, L.E.D., 2-FACE, BRACKET MOUNTED				
	WITH COUNTDOWN TIMER	EACH	12	\$1,900.00	\$22,800.00
LC000335	L.E.D. INTERNALLY ILLUMINATED STREET NAME SIGN	EACH	17	\$2,000.00	\$34,000.00
LC000352	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION)	EACH	5	\$33,000.00	\$165,000.00
LC000353	REMOTE-CONTROLLED VIDEO SYSTEM	EACH	5	\$2,600.00	\$13,000.00
LC000407	ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR	FOOT	3255	\$1.50	\$4,882.50
LC000411	TRAFFIC SIGNAL POST 10 FT. (SPECIAL)	EACH	3	\$3,000.00	\$9,000.00
LC000412	TRAFFIC SIGNAL POST 16 FT. (SPECIAL)	EACH	8	\$3,500.00	\$28,000.00
LC000414	RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSE	EACH	1	\$1,000.00	\$1,000.00
LC000415	RIGHT OF ENTRY PERMIT	L SUM	1	\$1,500.00	\$1,500.00
LC000468	TERMINATE FIBER IN CABINET	EACH	210	\$50.00	\$10,500.00
LC000469	SPLICE FIBER OPTIC CABLE IN CABINET	EACH	36	\$50.00	\$1,800.00
LC000500	LAYER II (DATA LINK) SWITCH	EACH	5	\$5,500.00	\$27,500.00
LC000501	LAYER III (NETWORK) SWITCH	EACH	1	\$8,500.00	\$8,500.00
LC000404	VIDEO COMMUNICATIONS CABINET	EACH	1	\$21,000.00	\$21,000.00
LC000502	RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM	EACH	1	\$700.00	\$700.00
X0300739	UNINTERRUPTIBLE POWER SUPPLY	EACH	1	\$6,000.00	\$6,000.00
X0322925	ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 1C	FOOT	14728	\$1.15	\$16,937.20
X0322929	CAMERA MOUNTING ASSEMBLY	EACH	1	\$1,500.00	\$1,500.00
X8710020	FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125 MM12F SM12F	FOOT	14847	\$3.00	\$44,541.00
X8730250	ELECTRIC CABLE IN CONDUIT, NO. 20 3C, TWISTED, SHIELDED	FOOT	2047	\$1.25	\$2,558.75
X8800020	SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED	EACH	20	\$990.00	\$19,800.00
X8800035	SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, BRACKET MOUNTED	EACH	7	\$950.00	\$6,650.00
X8800040	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED	EACH	12	\$1,405.00	\$16,860.00
X8800045	SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, MAST ARM MOUNTED	EACH	18	\$1,465.00	\$26,370.00
X8800060	SIGNAL HEAD, L.E.D., 2-FACE, 3-SECTION, BRACKET MOUNTED	EACH	1	\$1,745.00	\$1,745.00
LC000336	SIGNAL HEAD, L.E.D., 2-FACE, 5-SECTION, BRACKET MOUNTED	EACH	3	\$2,770.00	\$8,310.00
X8805280	SIGNAL HEAD, L.E.D., 2-FACE, 1-3 SECTION, 1-5 SECTION,				
	BRACKET MOUNTED	EACH	2	\$2,530.00	\$5,060.00
XX002264	ELECTRIC CABLE IN CONDUIT, RAILROAD NO. 14 3C	FOOT	415	\$2.15	\$892.25
XX003661	ELECTRIC CABLE IN CONDUIT, COAXIAL	FOOT	816	\$1.60	\$1,305.60
XX003665	REBUILD EXISTING HANDHOLE TO DOUBLE HANDHOLE	EACH	1	\$2,000.00	\$2,000.00
Z0048665	RAILROAD PROTECTIVE LIABILITY INSURANCE	L SUM	1	\$7,400.00	\$7,400.00
			SUB-TO	TAL	\$1,174,178.65

10% CONTINGENCY **\$117,417.87**

TOTAL \$1,291,596.52

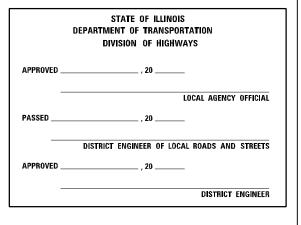
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COUNTY : LAKE

SECTION: 96-00080-39-TL

F.A.U. 0182 (ROLLINS ROAD)





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STREET ADDRESS
CITY, IL ZIP
(YYX) PHONF

ROUTE SECTION COUNTY SHEET SHEETS CH 44 02-00088- LAKE 1 37 COVER SHEET: APTAKISIC ROAD - - - ILLINOIS

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SHEETS

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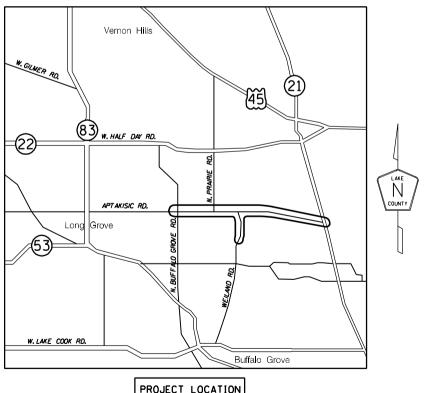
LCDOT STANDARD TRAFFIC SIGNAL DESIGN DETAILS - SHEET 1 OF 2

LCDOT STANDARD TRAFFIC SIGNAL DESIGN DETAILS - SHEET 2 OF 2

TYPICAL PAVEMENT MARKINGS FOR COUNTY HIGHWAYS - 1 OF 3
         TYPICAL PAVEMENT MARKINGS FOR COUNTY HIGHWAYS - 2 OF 3
TYPICAL PAVEMENT MARKINGS FOR COUNTY HIGHWAYS - 3 OF 3
         DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS - 1 OF 4 DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS - 2 OF 4
         DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS - 3 OF 4 DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS - 4 OF 4
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COUNTY OF LAKE DIVISION OF TRANSPORTATION TRAFFIC SIGNAL IMPROVEMENTS APTAKISIC ROAD FROM BUFFALO GROVE ROAD TO PARKWAY DRIVE 02-00088-14-TL LAKE COUNTY CONTRACT #23028

STATE OF ILLINOIS



FOR UNDERGROUND UTILITY LOCATIONS, CALL

J.U.L.I.E.

TOLL FREE
TEL. 800-892-0123

PLANS	PREPARED	BY:	STREET ADDRESS CITY, ILLINOIS ZIP (xxx) PHONE	
APP	DATE:	MARTIN G.	. BUEHLER, COUNTY ENGINEER	
APP	DATE:		TRAFFIC ENGINEER	

CONSULTING FIRM

		ENGINEER DATE
REVISI	ONS	PROJECT MANAGER
NAME	DATE:	ILLINOIS REGISTRATION No. XXX-XXXXX
		EXPIRATION DATE: 11-30-20YR
		PROFESSIONAL DESIGN FIRM No.: XXX-XXXXX
		SIGNATURE:
		TRAFFIC ENCINEER

SUMMARY OF QUANTITIES

	LOCATION OF WORK			COMMI		APTAKISI	C ROAD e			
	SUMMARY OF QUANTITIES			BUFFALO	PRAIRIE	WEILAND	BOND	BARCLAY	PARKWAY	INTERCONNE
E NO.		UNIT	TOTAL	GROVE ROAD	ROAD	ROAD	STREET	BOULEVARD	DRIVE	
	CONDUIT IN GROUND, 2" DIA., GALVANIZED STEEL	FOOT	2809			44				2765
	CONDUIT IN GROUND, 2 1/2" DIA., GALVANIZED STEEL	FOOT	86		37		42	7		
4022	CONDUIT IN GROUND, 3" DIA., GALVANIZED STEEL	FOOT	475	102	78	37	148	78	32	
	CONDUIT IN GROUND, 4" DIA., GALVANIZED STEEL	FOOT	220			119		101		
	PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH	SO FT	1100		195	295	225	215	170	
	COMBINATION CURB AND GUTTER REMOVAL	FOOT	244		46	40	53	81	24	
	D BITUMINOUS SHOULDER REMOVAL	SO YD	48.8		9	5.9	9.5	16.7	7.7	
03900	COMBINATION CONCRETE CURB AND GUTTER, TYPE 8-6.12									
	(ABUTTING EXISTING PAVEMENT)	FOOT	244		46	40	53	81	24	
	TRAFFIC CONTROL AND PROTECTION	L SUM	1	70.0		** *	** *	100.0		1
	THERMOPLASTIC PAVEMENT MARKING - LETTERS AND SYMBOLS	SO FT	327.6	72. 8	25.0	72.8	72.8	109. 2	147	
	THERMOPLASTIC PAVEMENT MARKING - LINE 12"	FOOT	1573		268	314	255	593	143	
	THERMOPLASTIC PAVEMENT MARKING - LINE 24" THERMOPLASTIC PAVEMENT MARKING REMOVAL	SO FT	466.9	100.2		175.7	72.0	100.2		
	HANDHOLE	EACH	6	109. 2		113.1	72.8	109. 2		
	HEAVY-DUTY HANDHOLE	EACH	1					- 1		5
	ELECTRIC CABLE IN CONDUIT, 600V (EPR-TYPE RHW) 2-1/C NO, 10	FOOT	3255	869	563	565	498	760		-
	LUMINAIRE, SODIUM VAPOR, HORIZONTAL MOUNT,	1001	3633	002	363	303	430	100		
2230	PHOTO-CELL CONTROL, 250 WATT	EACH	17	4	3	3	3	4		
0200	MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION	EACH	8	1	1	-	1	1	1	3
	FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL	EACH	1			1				-
	FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL	EACH	5	1	1		1	1	1	
	TRANSCEIVER - FIBER OPTIC	EACH	6	1	1	1	1	1	1	
	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 2C	FOOT	4590		1218	1148	1089	1135		
	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 3C	FOOT	5297	523	1086	791	828	1762	307	
	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 5C	FOOT	4291	656	1039	1214	853	529		
	ELECTRIC CABLE IN CONDUIT, SIGNAL NO. 14 TC	FOOT	3335	1104	468	527	245	991		
	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 20 FT. (SPECIAL)	EACH	1		1					
	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 28 FT. (SPECIAL)	EACH	1				1			
	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 30 FT. (SPECIAL)	EACH	4		1	1	1	1		
_	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 32 FT. (SPECIAL)	EACH	4		1	1	. 1	1		
	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 34 FT. (SPECIAL)	EACH	3	2				1		
	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 38 FT. (SPECIAL)	EACH	2	1				1		
130	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE 40 FT. (SPECIAL)	EACH	1	1.						
4180	STEEL COMBINATION MAST ARM ASSEMBLY AND POLE SO FT. (SPECIAL)	EACH	1			1				
0100	CONCRETE FOUNDATION, TYPE A	FOOT	20		- 8		8	4		
0400	CONCRETE FOUNDATION, TYPE E 30-INCH DIAMETER	FOOT	225	45	45	30	45	60		
0415	CONCRETE FOUNDATION, TYPE E 36-INCH DIAMETER	FOOT	30	15	-	15				
0200	DRILL EXISTING HANDHOLE	EACH	26	4	5	5	6	2		4
0210	TRAFFIC SIGNAL BACKPLATE, LOUVERED, ALUMINUM	EACH	38	8	6	6	6	8	4	
0100	INDUCTIVE LOOP DETECTOR	EACH	13	4	2	3	2	2		
0200	LIGHT DETECTOR	EACH	8	2	2	2		2		
0300	LIGHT DETECTOR AMPLIFIER	EACH	4	1	1	1		1		
0100	PEDESTRIAN PUSH-BUTTON	EACH	32	8	4	4	4	8	4	
	TEMPORARY TRAFFIC SIGNAL INSTALLATION	EACH	1			1				
1400	RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM,		-							
	DETECTOR UNIT	EACH	1				1			
1410	RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM,									
	PHASING UNIT	EACH					- 1			
	MODIFY EXISTING CONTROLLER	EACH	1					1	1	
	REMOVE ELECTRIC CABLE FROM CONDUIT	FOOT	35109	6698	3367	3740	3178	5016	1050	12060
	REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT	EACH	7	1	1	1	1	1	1	1
_	REMOVE EXISTING HANDHOLE	EACH	2		1		1			
	REMOVE EXISTING CONCRETE FOUNDATION	EACH	20	4	4	4	4	4		
_	ENGINEER'S FIELD OFFICE, TYPE A (MODIFIED)	CAL MO	4							4
	SODDING (COMPLETE)	SO YD	1200		_	-	_			
	L.E.D. INTERNALLY ILLUMINATED STREET NAME SIGN	EACH	17	4	3	3	3	4		
1357	PEDESTRIAN SIGNAL HEAD, L.E.D., 1-FACE, BRACKET MOUNTED	5450								
1270	WITH COUNTDOWN TIMER	EACH	8		2	2	2		2	
338	PEDESTRIAN SIGNAL HEAD, L.E.D., 2-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER	54511	12							
	THE PROPERTY OF THE PROPERTY O	EACH	12	4	1	I	1	4	1	
175-		Ciru				1				
	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION)	EACH	5	1	1	1	1	1	,	
353	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM	EACH	5	1	1	1		1	1	
0353 0407	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM LECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR	EACH FOOT	5 3255		1 1 563		1 498	1 760	1	
0353 0407 0411	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM TELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL)	EACH FOOT EACH	5 3255 3	1 869	1	1 565	498	1 760 1	1	
0353 0407 0411 0412	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL)	EACH FOOT EACH EACH	5 3255 3 8	1	1 1 563	1 565		1 760	1	
0353 0407 0411 0412 0414	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)	EACH FOOT EACH EACH EACH	5 3255 3 8	1 869	1 1 563	1 565 1	498	1 760 1	1	
0353 0407 0411 0412 0414 0415	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM FLECTRIC CABLE IN COMDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT	EACH FOOT EACH EACH EACH L SUM	5 3255 3 8 1	1 869 4	1 1 563 2	1 565	498	1 760 1 1		
0353 0407 0411 0412 0414 0415 0468	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)	EACH FOOT EACH EACH EACH	5 3255 3 8	1 869	1 1 563	1 565 1	498	1 760 1 1	18	
0353 0407 0411 0412 0414 0415 0468	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM TELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET	EACH FOOT EACH EACH EACH L SUM EACH	5 3255 3 8 1 1 210	1 869 4	1 1 563 2	1 565	498	1 760 1 1		
0353 0407 0411 0412 0414 0415 0468 0469	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT	EACH FOOT EACH EACH EACH L SUM EACH EACH	5 3255 3 8 1 1 210 36	1 869 4	1 1 563 2	1 565	498 2 36 12	1 760 1 1 1 36	18 12	
0353 0407 0411 0412 0414 0415 0468 0469 0500	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM FLECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER II (DATA LINK) SWITCH	EACH FOOT EACH EACH EACH L SUM EACH EACH EACH	5 3255 3 8 1 1 210 36 5	1 869 4	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12	
353 407 411 412 414 9415 9469 9500 9501	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM TELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPELICE FIBER OPTIC CABLE IN CONDUIT LAYER II 1 (DATA LINK) SWITCH LAYER III (NATAUTHORK) SWITCH	EACH FOOT EACH EACH EACH L SUM EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5	1 869 4	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12	
353 407 411 412 414 415 468 469 500 501 404	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM TELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPELICE FIBER OPTIC CABLE IN CONDUIT LAYER II (DATA LINK) SWITCH VIDEO COMMUNICATIONS CABINET	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1	1 869 4	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12	
353 407 411 412 414 415 468 469 500 501 404 502	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM REMOTE CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) REAFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT JERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH LAYER 111 (NETWORK) SWITCH LYDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM	EACH FOOT EACH EACH EACH L SUM EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5	1 869 4 18	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12	14728
353 407 411 412 414 415 468 469 500 501 404 502 739	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM RELOCTRIC CABLE IN CONDUIT, COMAUMICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT STERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY	EACH FOOT EACH EACH EACH L SUM EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1	1 869 4 18	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12	14728
353 407 411 412 414 415 469 500 501 404 502 739 925	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM FLECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPELICE FIBER OPTIC CABLE IN CONDUIT LAYER 111 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM DUMINTERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 1 1 1	1 869 4 18	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12 1	14728
353 407 411 412 414 415 468 469 500 501 739 929 929	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 11 (DATA LINK) SWITCH LAYER 11 (INTERWORK) SWITCH LAYER 11 (INTERWORK) SWITCH LYIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UMINITERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 1C CAMERA MOUNTING ASSEMBLY	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 1 14728	1 869 4 18	1 1 563 2	1 565 1 1 1 66	498 2 36 12	1 760 1 1 1 36	18 12 1	
0353 0407 0411 0412 0414 0415 0469 0500 0501 0404 0502 0739 0929 0020 0250	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM TRAFFIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT STERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 111 (NATA LINK) SWITCH LAYER 111 (NATWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMPAR MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847	1 869 4 18	1 1 563 2 36	1 565 1 1 1 66	498 2 36 12 1	1 760 1 1 1 36 12	18 12 1	
0353 0407 0411 0412 0414 0415 0468 0469 0500 0501 0404 0502 0502 0502 0502 0502 0502 0502	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM TELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 111 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62, 5/125 MM12F SM12F ELECTRIC CABLE IN CONDUIT, NO. 62, 5/125 MM12F SM12F ELECTRIC CABLE IN CONDUIT, NO. 62, 5/125 MM12F SM12F	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047	1 869 4 18 1	1 1 1 563 2 2 36 1	1 565 1 1 1 66	498 2 36 12 1	1 760 1 1 1 36 12 1	18 12 1	
0353 0407 0411 0412 0414 0415 0468 0469 0500 0501 0404 0502 0739 0739 0739 0739 0739 0739 0739 0739	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT JERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH LAYER 111 (NETWORK) SWITCH LYDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY SLECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F SLECTRIC CABLE IN CONDUIT, NO. 30, TWISTEO, SHIELDED SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 1 14847 2047 20	1 869 4 18 1	1 1 1 563 2 2 36 1	1 565 1 1 1 66 1 1 1 1	498 2 36 12 1	1 760 1 1 1 36 12 1	18 12 1	
0353 0407 0411 0412 0414 0415 0469 0500 0501 0404 0502 0739 0925 0020 0035 0040	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM TRAFFIC CABLE IN COMDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT 3 TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT DAYER II (DATA LINK) SWITCH LAYER III (NETWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY SELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62, 5/125 MM12F SM12F SELECTRIC CABLE IN CONDUIT, NO. 20 3C, TWISTEO, SHIELDED SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, BRACKET MOUNTED	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 2047	1 869 4 18 1 1	1 1 1 563 2 36 1	1 565 1 1 1 666 1 1 1 1 1	498 2 36 12 1	1 760 1 1 1 36 12 1	18 12 1 1	
0353 0407 0411 0412 0414 0415 0468 0500 0501 0404 0502 0739 0925 0020 0025 00404 00404 00404 00404 00404 00404 00404	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) TRELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 11 (DATA LINK) SWITCH LAYER 11 (INTERWORK) SWITCH LAYER 11 (INTERWORK) SWITCH LAYER III (NETWORK) SWITCH LAYER III (NETWORK) SWITCH LAYER III (NETWORK) SWITCH LAYER III (NETWORK) SWITCH LAYER III (DATA LINK) SWITCH	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 20 7	1 869 4 18 1 1 523 3	1 1 1 563 2 36 1	1 565 1 1 1 66 1 1 1 1 381 4	498 2 36 12 1	1 760 1 1 1 36 12 1	18 12 1 1 1 97 2 2	
0353 0407 0411 0412 0414 0415 0468 0469 0500 0501 0404 0404 0502 0739 0020 0020 0035 00404 00404 00404 00404 00404 00404 00404	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM FLECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 I DATA LINKS SWITCH LAYER 11 I INETWORK) SWITCH LAYER III I NETWORK) SWITCH LAYER III I NETWORK SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY FIBER OPTIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F ELECTRIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F ELECTRIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MST ARM MOUNTED SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 20 7	1 869 4 18 1 1 523 3 3 5	1 1 1 563 2 36 1	1 565 1 1 1 66 1 1 1 1 1 1 1 1 1 1 1 1 1	498 2 36 12 1	1 760 1 1 1 36 12 1 1	18 12 1 1 1 97 2 2 1 2	
0353 0407 0411 0412 0414 0415 0468 0500 0501 0404 0502 0739 0929 00020 00035 00040 00045	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM RELOCTRIC CABLE IN CONDUIT, COMAUMICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT STERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMPERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F SIGNAL MEAD, L.E. D. 1-FACE, 3-SECTION, MAST ARM MOUNTED SIGNAL HEAD, L.E. D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 2-FACE, 3-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 2-FACE, 3-SECTION, BRACKET MOUNTED	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 2047 2047 2047 12	1 869 4 18 1 1 523 3	1 1 1 563 2 36 1	1 565 1 1 1 66 1 1 1 1 1 1 1 1 1 1 1 1 1	498 2 36 12 1	1 760 1 1 1 36 12 1	18 12 1 1 1 97 2 2	
0353 0407 0411 0412 0414 0415 0468 0500 0501 0404 0502 0739 0929 00020 00035 00040 00045	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM ELECTRIC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) TRAFFIC SIGNAL POST 16 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT TERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH LAYER 111 (NETWORK) SWITCH LYTHER CABLE IN CONDUIT, TRACER NO. 14 IC CAMERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 20 3C, TWISTEO, SHIELDED SIGNAL HEAD, L.E. D., 1-FACE, 3-SECTION, MAST ARM MOUNTED SIGNAL HEAD, L.E. D., 1-FACE, 3-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 2-FACE, 3-SECTION, BRACKET MOUNTED	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 20 7 12 18 1 3	1 869 4 18 1 1 523 3 3 5	1 1 1 563 2 36 1	1 565 1 1 1 66 1 1 1 1 1 1 1 1 1 1 1 1 1	498 2 36 12 1	1 760 1 1 1 36 12 1 1	18 12 1 1 97 2 2 1 2	
0353 0407 0411 0412 0414 0415 0468 0469 0502 0739 092925 09290 0025 0003 0004 0004 0004 0004 0004 0004 000	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM RELOCTRIC CABLE IN CONDUIT, COMAUMICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT STERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 11 (DATA LINK) SWITCH LAYER 111 (NETWORK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMPERA MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F SIGNAL MEAD, L.E. D. 1-FACE, 3-SECTION, MAST ARM MOUNTED SIGNAL HEAD, L.E. D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 2-FACE, 3-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E. D., 2-FACE, 3-SECTION, BRACKET MOUNTED	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 2047 2047 2047 12	1 869 4 18 1 1 523 3 3 5	1 1 1 563 2 36 1	1 565 1 1 1 66 1 1 1 1 1 1 1 2	498 2 36 12 1	1 760 1 1 1 36 12 1 1	18 12 1 1 1 97 2 2 1 2	
0353 0407 0411 0412 0414 0415 0468 0469 05501 0404 0502 0739 0929 0929 0929 0929 0929 0929 0929 09	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 1 14728 1 14847 2047 2047 20 7	1 869 4 18 1 1 523 3 3 5	1 1 1 563 2 36 1	1 565 1 1 1 1 666 1 1 1 1 1 1 1 1 1 1 1	498 2 36 12 1	1 760 1 1 1 36 12 1 1	18 12 1 1 97 2 2 1 2	
0353 0407 0411 0412 0414 0416 0416 0468 0468 0468 0469 0500 0501 0404 0502 0020 0020 0025 0020 0025 0046	VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) REMOTE-CONTROLLED VIDEO SYSTEM REMOTE-CONTROLLED VIDEO SYSTEM RELOCTEC CABLE IN CONDUIT, COMMUNICATION NO. 16, 5 1/2 PAIR TRAFFIC SIGNAL POST 10 FT. (SPECIAL) RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION) RIGHT OF ENTRY PERMIT STERMINATE FIBER IN CABINET SPLICE FIBER OPTIC CABLE IN CONDUIT LAYER 111 (NATA LINK) SWITCH LAYER 111 (NATA LINK) SWITCH VIDEO COMMUNICATIONS CABINET RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM UNINTERRUPTIBLE POWER SUPPLY ELECTRIC CABLE IN CONDUIT, TRACER NO. 14 IC CAMPAR MOUNTING ASSEMBLY FIBER OPTIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F ELECTRIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F ELECTRIC CABLE IN CONDUIT, NO. 62,5/125 MM12F SM12F SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, MAST ARM MOUNTED SIGNAL HEAD, L.E.D., 1-FACE, 3-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 1-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 2-FACE, 3-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 2-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 2-FACE, 3-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 2-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 2-FACE, 5-SECTION, BRACKET MOUNTED SIGNAL HEAD, L.E.D., 2-FACE, 1-3 SECTION, 1-5 SECTION, BRACKET MOUNTED ELECTRIC CABLE IN CONDUIT, RAILROAD NO. 14 3C	EACH FOOT EACH EACH EACH EACH EACH EACH EACH EACH	5 3255 3 8 1 1 210 36 5 1 1 1 14728 1 14847 2047 20 7 7 12 18 1 3	1 869 4 18 1 1 523 3 5 5	1 1 1 563 2 36 1	1 565 1 1 1 666 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1	498 2 36 12 1	1 760 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18 12 1 1 97 2 2 1 2	

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SUMMARY OF QUANTITIES

APTAKISIC ROAD FROM BUFFALO GROVE RD. TO PARKWAY DR. LAKE COUNTY. ILLINOIS

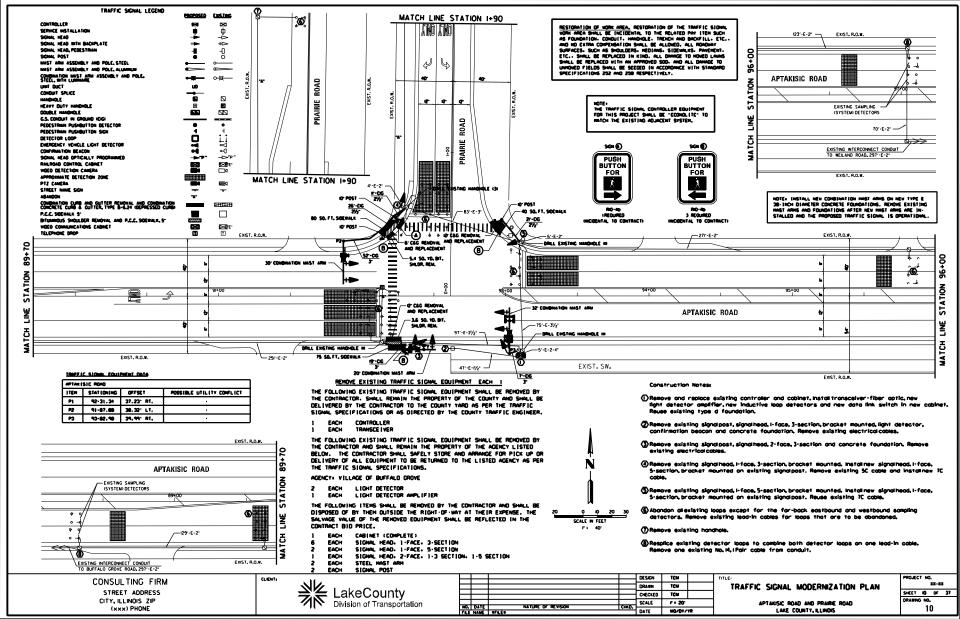
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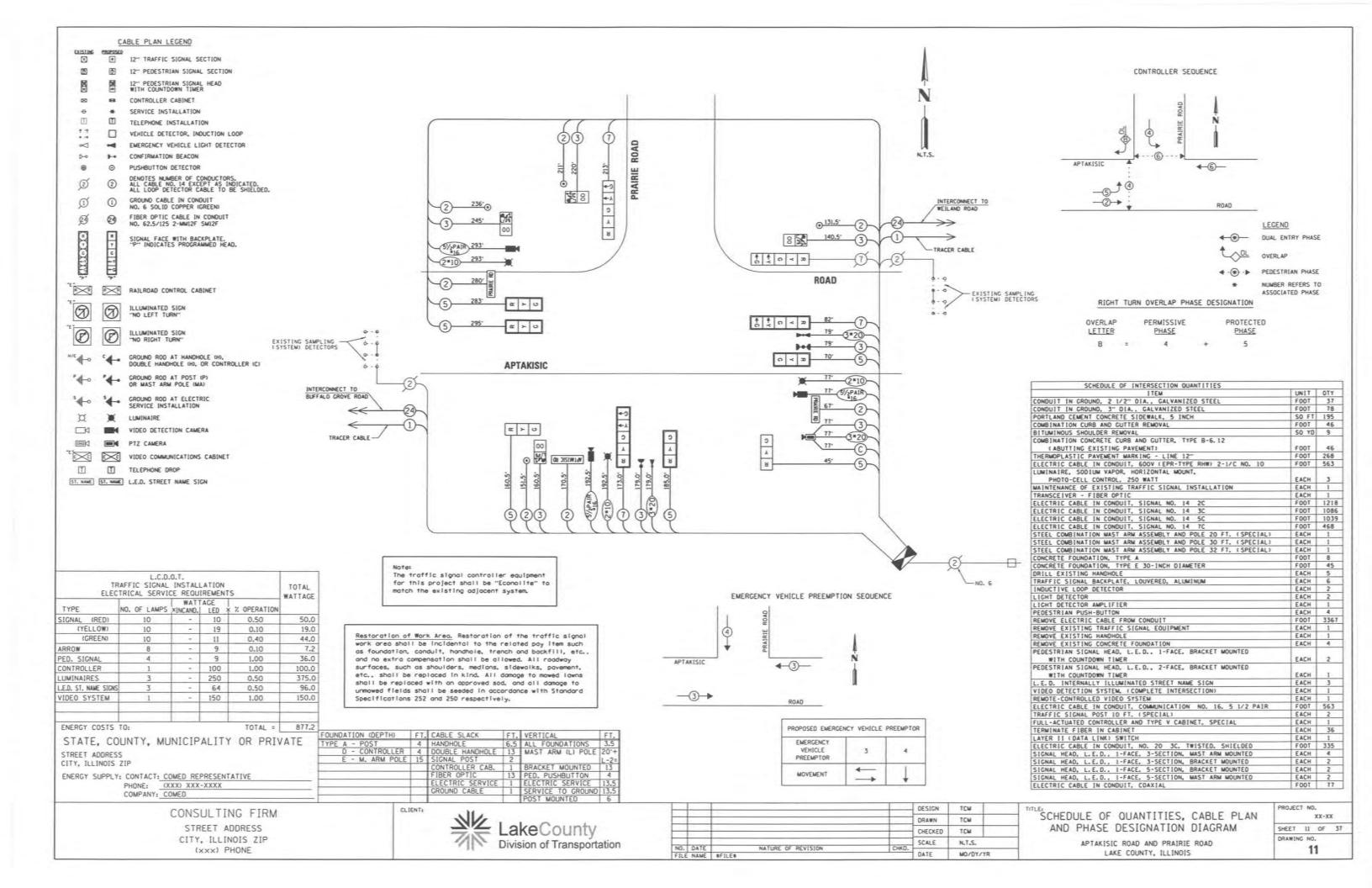
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SHEET 2 OF 37

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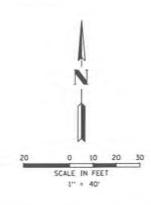
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NOTES FOR TEMPORARY TRAFFIC SIGNALS

- 1. All control equipment including emergency pre-emption and communication devices for the temporary traffic signal(s) shall be furnished by the
- 2. Only Econolite controllers supplied by one of the County approved closed loop equipment manufacturers will be approved for use at temporary signal locations. All controllers used for temporary traffic signals shall be fully-actuated NEMA microprocessor based with RS232 data entry parts compatible with existing monitoring software approved by the County installed in a NEMA TS1 or TS2 cobinet.
- 3. All traffic signal sections and pedestrian signal sections shall be 12". Heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Engineer. The Contractor shall furnish enough cable stack to relocate heads to any position on the span wire for construction stoging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cobie from the controller cobinet to the signal head.
- 4. All existing street name and intersection regulatory signs shall be removed from existing poles, relocated, and securely fastened to the signal spon wire or wood pole as directed by the Engineer.
- 5. Any temporary signal within an existing closed loop traffic signal system shall be interconnected to that system.
- If no traffic staging is in place or will not be staged on the day of the turn-on, the temporary traffic signal shall have the signal head displays. signal head placements, and controller phasing match the existing traffic signal at the time of the turn-on.



Restoration of Work Area. Restoration of the traffic signal work area shall be incidental to the related pay Item such as foundation, conduit, handhole, trench and backfill, etc., and no extra compensation shall be allowed. All roadway surfaces, such as shoulders, medians, sidewalks, povement, etc., shall be replaced in kind. All damage to maked lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded in occordance with Standard Specifications 252 and 250 respectively.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT EACH 1

The following existing traffic signal equipment shall be removed by the Contractor, shall remain the property of the County and shall be delivered by the Controctor to the County yard as per the traffic signal specifications or as directed by the County Traffic Engineer.

Each Controller Tronsceiver Each

TEMPORARY TRAFFIC SIGNAL LEGEND

LOCATION

TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED ORIGINAL

TEMPORARY TRAFFIC SIGNAL HEAD SPAN WIRE MOUNTED SECONDARY LOCATION

TEMPORARY WOOD POLE ICLASS 5

TEMPORARY CONTROLLER CABINET

TEMPORARY SPAN WIRE, TETHER

TEMPORARY SERVICE INSTALLATION

PEDESTRIAN PUSHBUTTON DETECTOR

EMERGENCY VEHICLE LIGHT DETECTOR

VEHICLE DETECTOR, INDUCTION LOOP

G.S. CONDUIT IN GROUND (CIG)

TEMPORARY PEDESTRIAN SIGNAL HEAD, BRACKET MOUNTED

VIDEO DETECTION CAMERA

CONFIRMATION BEACON

HEAVY DUTY HANDHOLE

MICROWAVE DETECTOR

HANDHOLE

WIRE, AND CABLE

HIR

No.

UD

N

OR BETTER) 45 FOOT MINIMUM

The following existing traffic signal equipment shall be removed by the Contractor and shall remain the property of the Agency listed below. The Contractor shall safely store and arrange for pick up or delivery of all equipment to be returned to the listed Agency as per the traffic signal specifications.

Agency: Village of Buffalo Grove

2 Fach Light Detector

Eoch Light Detector Amplifier

The following items shall be removed by the Contractor and shall be disposed of by them outside the right-of-way at their expense. The salvage value of the removed equipment shall be reflected in the contract bid price.

Cabinet (Complete)

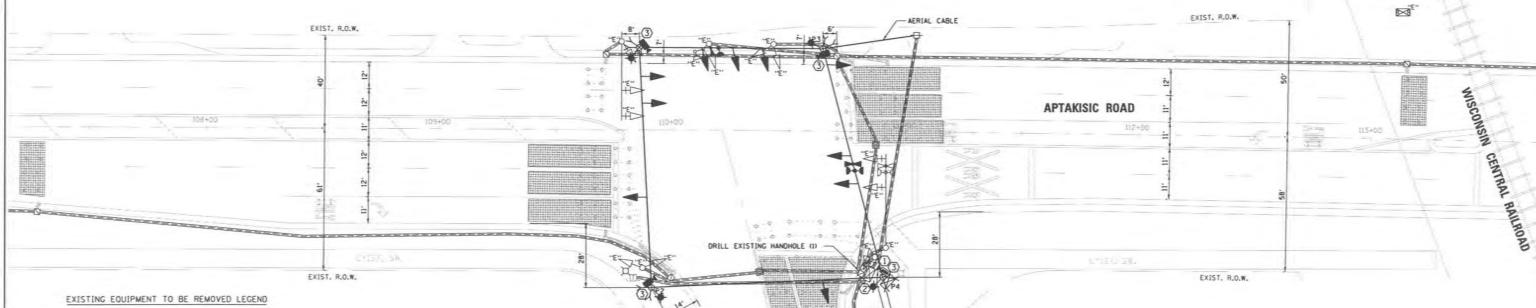
Signal Head, 1-Face, 3-Section Eoch

Signal Head, 1-Face, 5-Section Eoch Each Signal Head, 2-Face, 3-Section

Each Signal Head, 2-Face, 1-3 Section, 1-5 Section

Steel Mast Arm

Signal Post



WEILAND

ROAD

13

"E" = EXISTING SIGNAL HEAD TO BE REMOVED

EXISTING SERVICE INSTALLATION TO BE REMOVED

EXISTING SIGNAL POST AND FOUNDATION TO BE REMOVED

"E" EXISTING MAST ARM POLE AND FOUNDATION TO BE REMOVED EXISTING CONTROLLER AND FOUNDATION TO BE REMOVED "E" X

"E" 0 EXISTING HANDHOLE TO BE REMOVED

EXISTING PEDESTRIAN SIGNAL HEAD TO BE REMOVED

"E" @ EXISTING PEDESTRIAN PUSHBUTTON TO BE REMOVED

EMERGENCY VEHICLE LIGHT DETECTOR TO BE REMOVED

"E" Do CONFIRMATION BEACON TO BE REMOVED

EXISTING HEAVY-DUTY HANDHOLE TO BE REMOVED "E" 面

The traffic signal controller equipment for this project shall be "econolite" to match the existing adjacent system.

TRAFFIC SIGNAL EQUIPMENT DATA

TEM	STATIONING	OFFSET	POSSIBLE UTILITY CONFLICT
Pl.	109+85.97	35. 36° LT.	COMED
P2	109+91, 79	67.68° RT.	-
P3	110+64, 28	35, 36° LT.	COMED
P4	110+90.98	62.45' RT.	

Construction Notes:

- 1) The Contractor shall install the proposed unit duct for the temporary interconnect from the double handhole to the temporary wood pole.
- (2) The interconnect cables shall be disconnected from the existing controller, pulled back to the existing double handhole, and re-installed in the proposed unit duct to the temporary controller. The Contractor may splice temporary interconnect cobles to the existing interconnect cobles if sufficient slock Is unavailable. Maintaining the interconnect during construction shall be incidental to the cost of the temporary traffic signal installation.
- (3) The video detection system and the remote-controlled video system shall be relocated to the proposed traffic signal installation when the proposed traffic signal installation is turned on.

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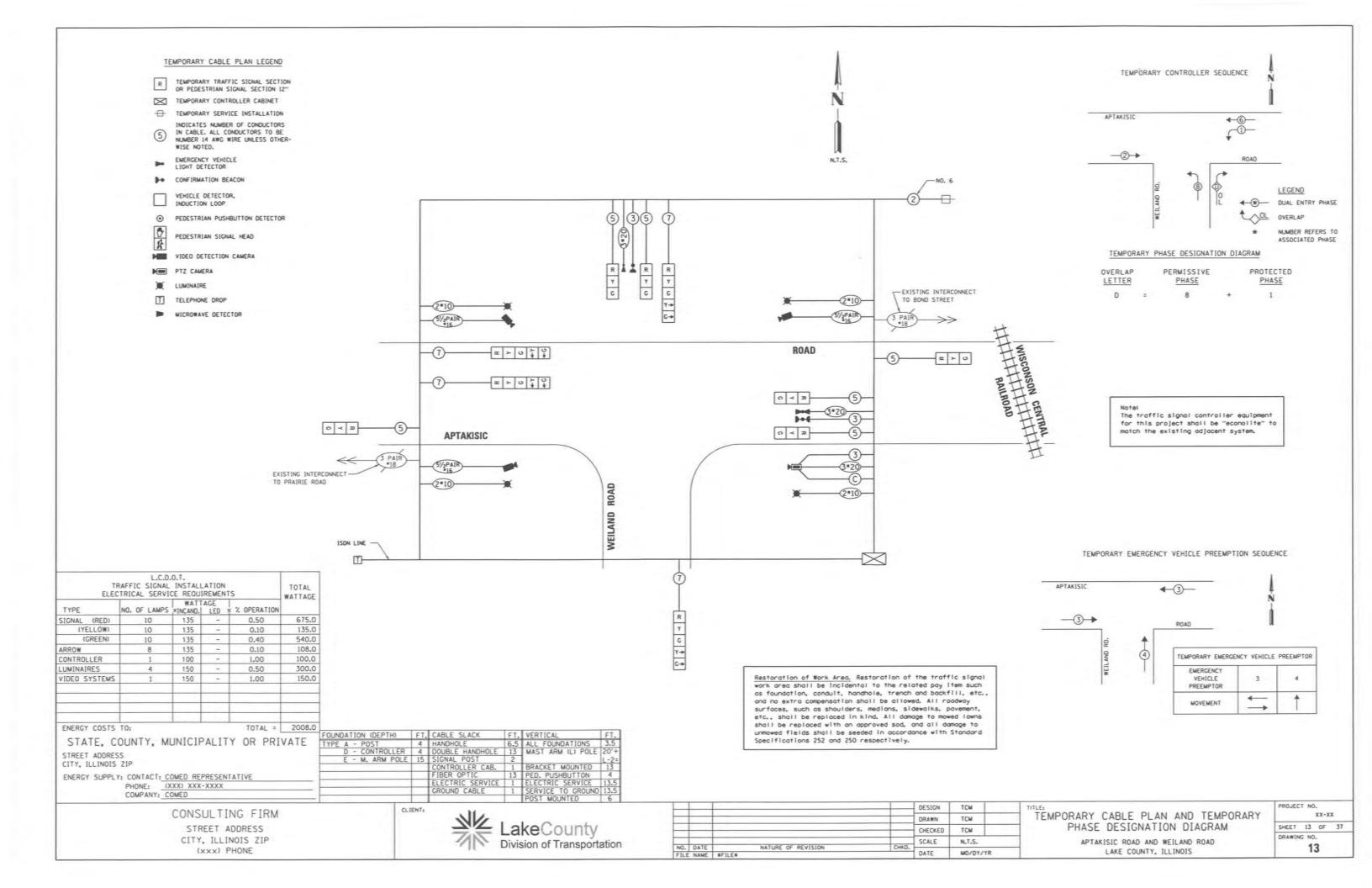
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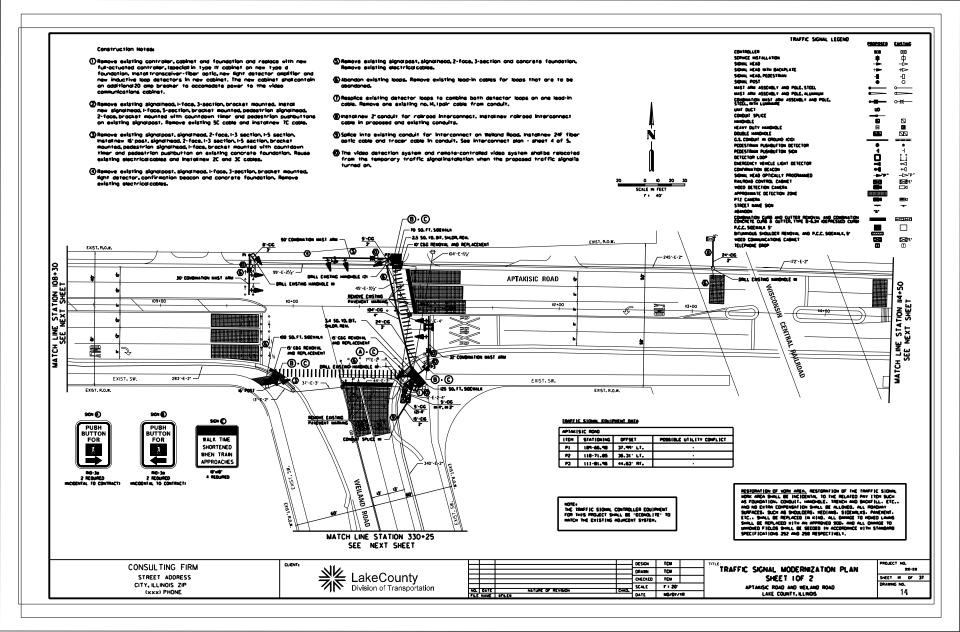
TEMPORARY TRAFFIC SIGNAL INSTALLATION

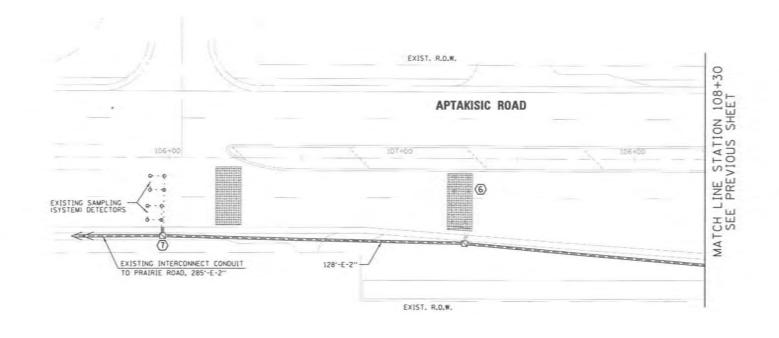
APTAKISIC ROAD AND WELLAND ROAD LAKE COUNTY, ILLINOIS

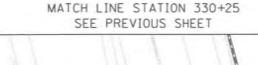
PROJECT NO. XX-XX SHEET 12 OF 37 DRAWING NO.

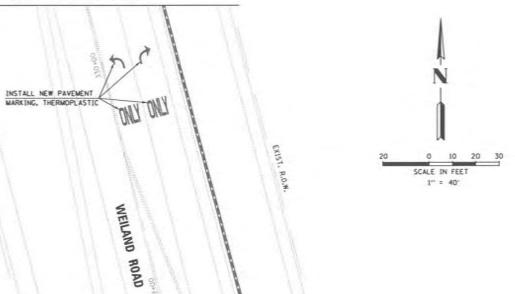
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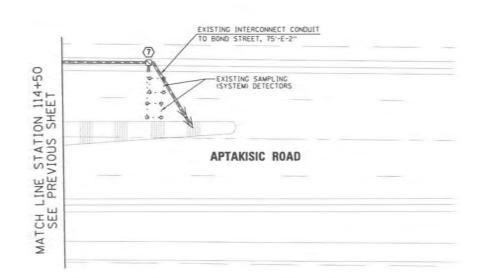












- (6) Abandon existing loops. Remove existing lead-in cables for loops that are to be abandoned.
- (7) Resplice existing detector loops to combine both detector loops on one lead-in cable. Remove one existing no. 14, 1 pair cable from conduit.



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TRAFFIC SIGNAL MODERNIZATION PLAN
SHEET 2 OF 2

APTAKISIC ROAD AND WEILAND ROAD

LAKE COUNTY, ILLINOIS

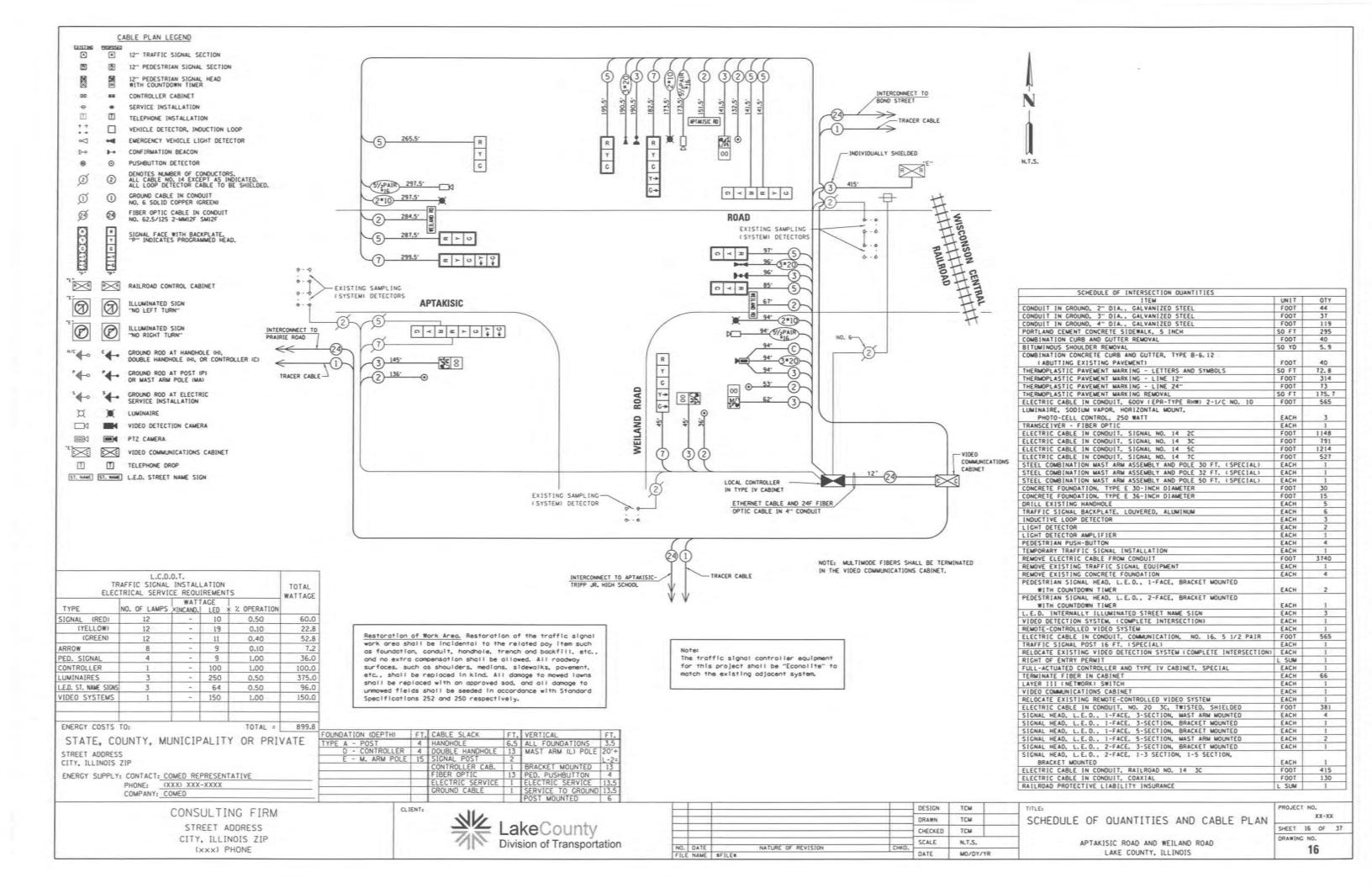
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SHEET 15 OF 37

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15



SEQUENCE OF OPERATION

MOVEMENT		← (6		2→	← (5		1 8	6		1
PHASE		1 + 6	5		2 +	- 6			8	3		
INTERVAL	1.	2	3	4	5	6A	68	7	8	94	98	1
CHANGE TO	/	2+	+6	/		-9	8	/			+6 +6	ł
APTAKISIC ROAD E/B ALL SIGNALS	R	R	R	G	G	Υ	R	R	R	R	R	F
APTAKISIC ROAD W/B NEAR RIGHT AND FAR RIGHT MAST ARM SIGNALS	G	G	G	G	G	Υ	R	R	R	R	R	F
APTAKISIC ROAD W/B END MAST ARM AND FAR LEFT SIGNALS	G ∢ G	G → Y	G	G	G	Y	R	R	R	R	R	F
WEILAND ROAD N/B END MAST ARM AND FAR LEFT SIGNALS	R	R	R	R	R	R	R	G	G	Υ	R	F
WEILAND ROAD N/B NEAR RIGHT AND FAR RIGHT MAST ARM SIGNALS	R G►	R Y►	R	R	R	R	R	G	G	Υ	R	F
PEDESTRIAN SIGNALS CROSSING WEILAND ROAD ON SOUTH SIDE OF APTAKISIC ROAD	н	н	Н	*P	**FH	Н	н	Н	Н	Н	Н	0
PEDESTRIAN SIGNALS CROSSING APTAKISIC ROAD ON EAST SIDE OF WEILAND ROAD	н	н	Н	н	Н	н	н	*	**FH	Н	Н	F

- * To appear only upon pushbutton actuation
- * * Flashing " is to terminate at the completion of the pedestrian interval clearance.
- P = Illuminated Person = WALK
- FH = Illuminated Flashing Hand = Flashing DON'T WALK
- H = Illuminated Solid Hand = DON'T WALK

Phase 2+6 shall be placed on recall.

RAILROAD PREEMPTION SEQUENCE OF OP	ERAT	ION					MPTOR BER 3	PREEN	MPTOR IER 4	PREEMPTOR NUMBER 2				
CHANGE FROM NORMAL SEQUENCE OF OPERATION INTERVAL NUMBER	1	- 3	4		7					7				
CHANGE FROM EMERGENCY VEHICLE PREEMPTION SEQUENCE OF OPERATION INTERVAL NUMBER	-					1	2	- 33	3					
RAILROAD PREEMPTION SEQUENCE OF OPERATION INTERVAL NUMBER	1.A	18	10	1D	1E	1F	1 G	1H	1J	2	3	4	5	CLEAR
CHANGE TO RAILROAD PREEMPTION SEQUENCE OF OPERATION INTERVAL NUMBER	2	10	2	1E	2	1 G	2	1J	2	3	4	5		NORMAL SEQUENCE
APTAKISIC ROAD E/B ALL SIGNALS	R	Υ	R	R	R	Y	R	R	R	R	R	R	R	Δ
APTAKISIC ROAD W/B NEAR RIGHT AND FAR RIGHT MAST ARM SIGNALS	G	G	G	R	R	G	G	R	R	G	Y	R	R	Δ
APTAKISIC ROAD W/B END MAST ARM AND FAR LEFT SIGNALS	G → G	G	G	R	R	G	G	R	R	G ∢ G	Υ	R	R	Δ
WEILAND ROAD N/B END MAST ARM AND FAR LEFT SIGNALS	R	R	R	Y.	R	R	R	Y	R	R	R	R	G	Δ
WEILAND ROAD N/B NEAR RIGHT AND FAR RIGHT MAST ARM SIGNALS	R Y►	R	R	Y	R	R	R	Y	R	R	R	R	G	Δ
PEDESTRIAN SIGNALS CROSSING WEILAND ROAD ON SOUTH SIDE OF APTAKISIC ROAD	н	FH	н	Н	Н	Н	Н	Н	Н	н	Н	н	Н	Δ
PEDESTRIAN SIGNALS CROSSING APTAKISIC ROAD ON EAST SIDE OF WEILAND ROAD	Н	Н	Н	FH	н	Н	Н	н	н	Н	Н	н	Н	Δ

Δ	Railroad preemption sequence shall provide the proper clearance
	interval to resume the normal sequence of operation or proper
	clearance interval to display an emergency vehicle interval
	(if applicable) after railroad preemption interval 5 is terminated.

EMERGENCY VEHICLE PREEMPTION SEQUE	NCE (0F 0	PERA	TION									PREEMPTOR NUMBER 3	PREEMPTOR NUMBER 4	
CHANGE FROM NORMAL SEQUENCE OF OPERATION INTERVAL NUMBER	1 1	1		1	4		4			7		7			CLEAR
EMERGENCY VEHICLE PREEMPTION SEQUENCE OF OPERATION INTERVAL NUMBER	1 A	18	10	10	1E	1F	1 G	1Н	1J	1K	1L	1M	2	3	NORMAL SEQUENCE
CHANGE TO EMERGENCY VEHICLE PREEMPTION SEQUENCE OF OPERATION INTERVAL NUMBER	18	2	10	3	2	1G	1H	3	1K	1L	2	3	100		\Q
APTAKISIC ROAD E/B ALL SIGNALS	R	R	R	R	G	G	Y	R	R	R	R	R	G	R	\Q
APTAKISIC ROAD W/B NEAR RIGHT AND FAR RIGHT MAST ARM SIGNALS	G	G	Y	R	G	G	Y	R	R	R	R	R	G	R	\Q
APTAKISIC ROAD W/B END MAST ARM AND FAR LEFT SIGNALS	G ⊸ Y	G	Y	R	G	G	Y	R	R	R	R	R	G	R	\Q
WEILAND ROAD N/B END MAST ARM AND FAR LEFT SIGNALS	R	R	R	R	R	R	R	R	G	Υ	R	G	R	G	0
WEILAND ROAD N/B NEAR RIGHT AND FAR RIGHT MAST ARM SIGNALS	R Y►	R	R	R	R	R	R	R	G	Y	R	G	R	G	\Q
PEDESTRIAN SIGNALS CROSSING WEILAND ROAD ON SOUTH SIDE OF APTAKISIC ROAD	Н	н	н	Н	FH	FH	Н	Н	н	н	н	Н	н	н	0

☼ Emergency vehicle sequence shall provide the proper clearance interval to resume the normal sequence of operation or proper clearance interval to display a different emergency interval after emergency vehicle interval 2 or 3 is terminated.

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LakeCounty
Division of Transportation

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PEDESTRIAN SIGNALS CROSSING APTAKISIC ROAD ON EAST SIDE OF WEILAND ROAD

SEQUENCE OF OPERATIONS

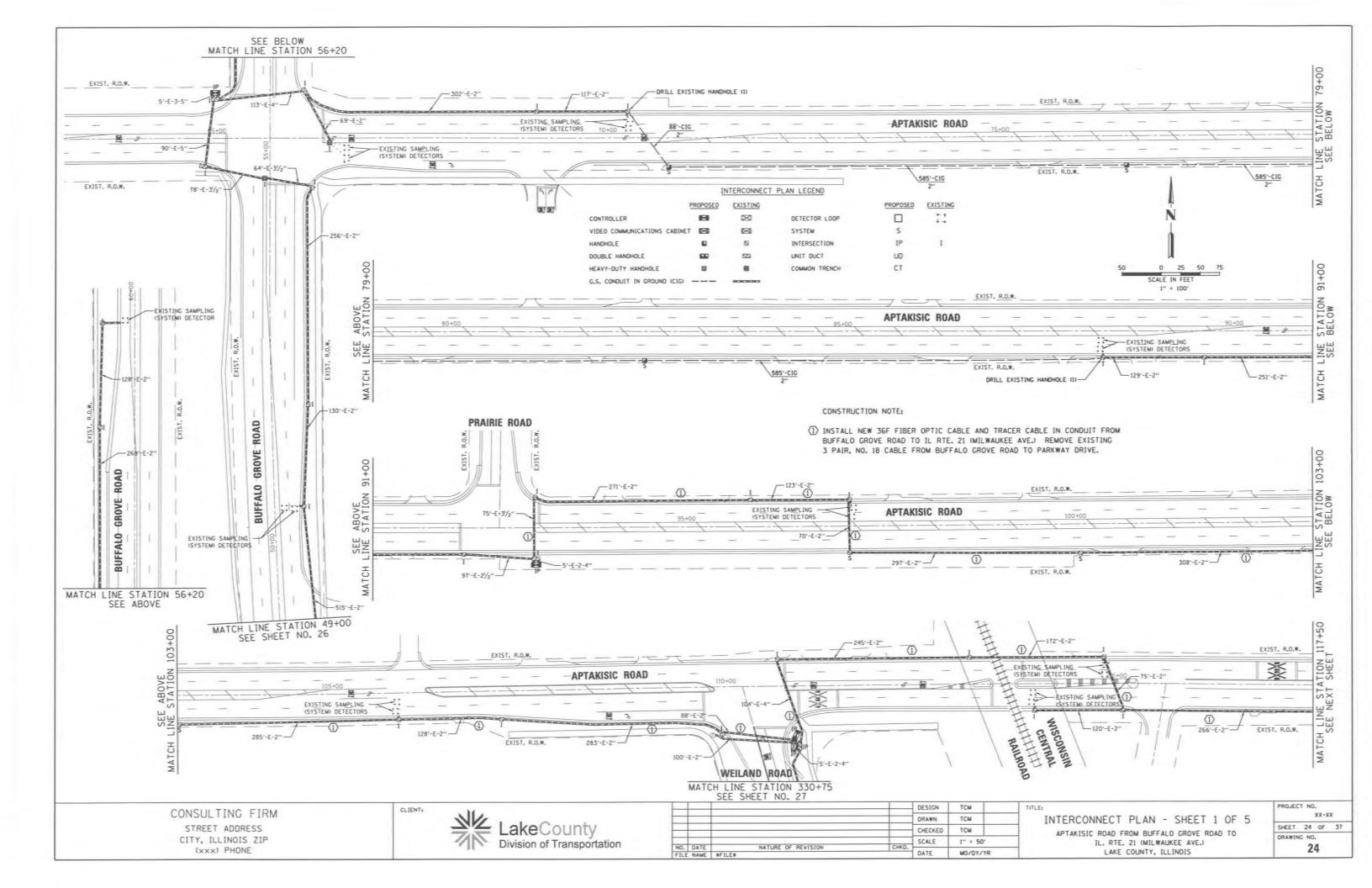
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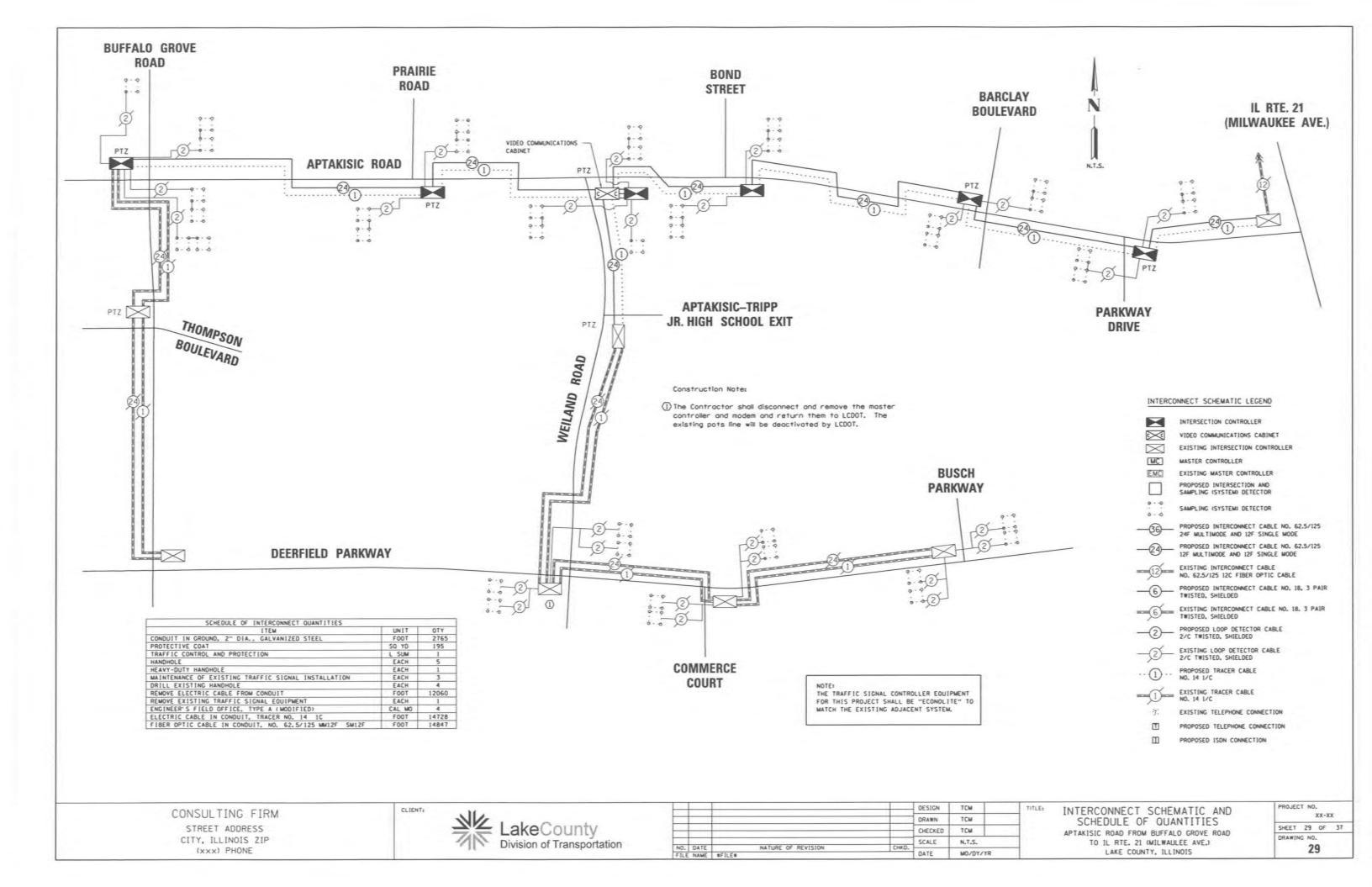
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17







UPPER TO LOWER CASE

SPACING CHART 8-6 INCH SERIES "C & D" SECOND LETTER ocde bhik goq lmnp s t v y T U SERIES C D C D C D C D C D C D C D AWX 2 14 14 15 12 14 06 10 11 14 06 10 11 12 12 14 14 5 20 21 14 5 11 12 14 5 12 14 16 17 14 15 20 21 12 14 06 10 12 14 12 14 14 15 14 15 CEG 4 5 20 21 4 5 6 10 12 14 12 14 15 14 5 DOOR 05 06 14 15 06 10 05 06 06 10 06 10 11 12 HIMN JU 2 14 14 15 12 14 05 06 11 12 11 12 12 14 12 14 2 14 6 17 2 14 6 10 12 14 1 2 6 17 6 0 6 0 1 1 2 1 2 06 10 14 15 11 12 06 10 12 14 12 14 12 14 12 14 05 06 14 15 06 10 05 06 05 07 05 06 06 10 11 12

LOWER CASE TO LOWER CASE SPACING CHART 6 INCH SERIES "C" & "D"

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NUMBER TO NUMBER SPACING CHART 8 INCH SERIES "C" & "D"

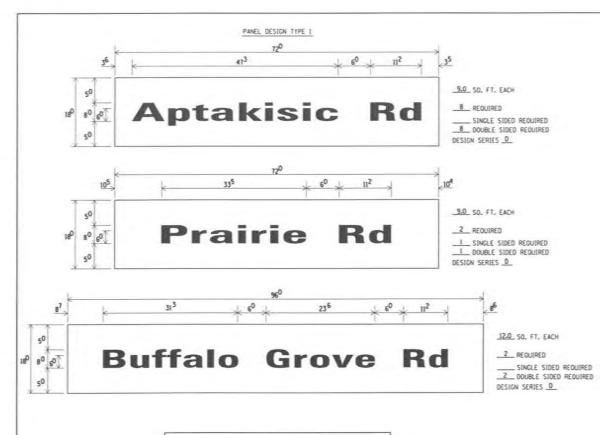
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UPPER AND LOWER CASE LETTER WIDTHS

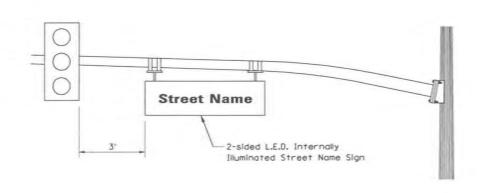
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В	32	40	43	53	b	35	42
c	32	40	43	53	c	35	4.1
D	32	40	43	53	d	35	42
E	30	35	40	47		35	42
F	30	35	40	47	+	23	26
G	32	40	43	53	0	35	42
ж	32	40	43	53	h	35	42
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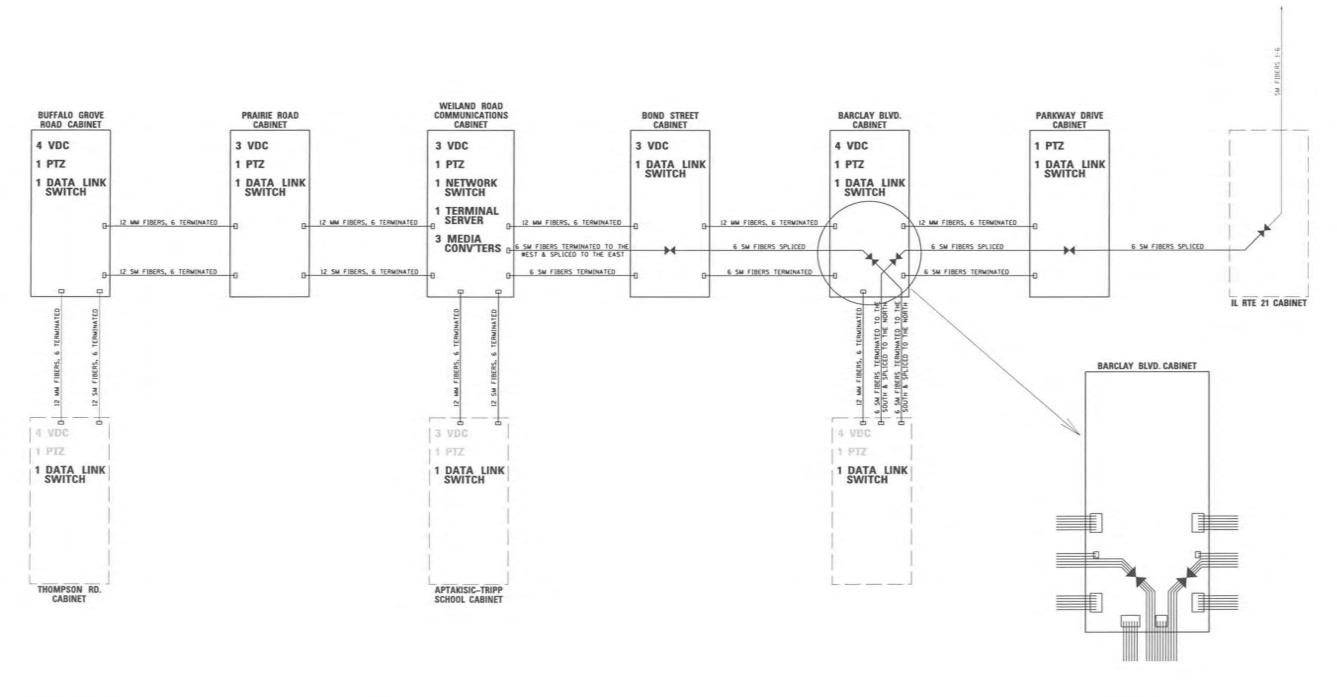
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4	35	40	47	57
5	32	40	43	53
6	32	40	43	53
7	32	40	43	53
8	32	P	43	53
9	32	40	43	53
0	34	42	45	55

		Lake C	County
REVISIONS		MAST ARM	MOUNTED
NAME	DATE		
NEW TITLE BLOCK	12/01/98	STREET NA	ME SIGNS
COOT COMMENTS 8	8/11/04		
		SHEET 1	OF 2
	-	SCALE: N.T.S.	DRAWN BY: JPS
		DATE: 01/12/98	CHECKED BY: ANK



Note: L.E.D. Illuminated Street Name Signs available only in 2 foot increments.





CONSULTING FIRM STREET ADDRESS CITY, ILLINOIS ZIP (xxx) PHONE LakeCounty
Division of Transportation

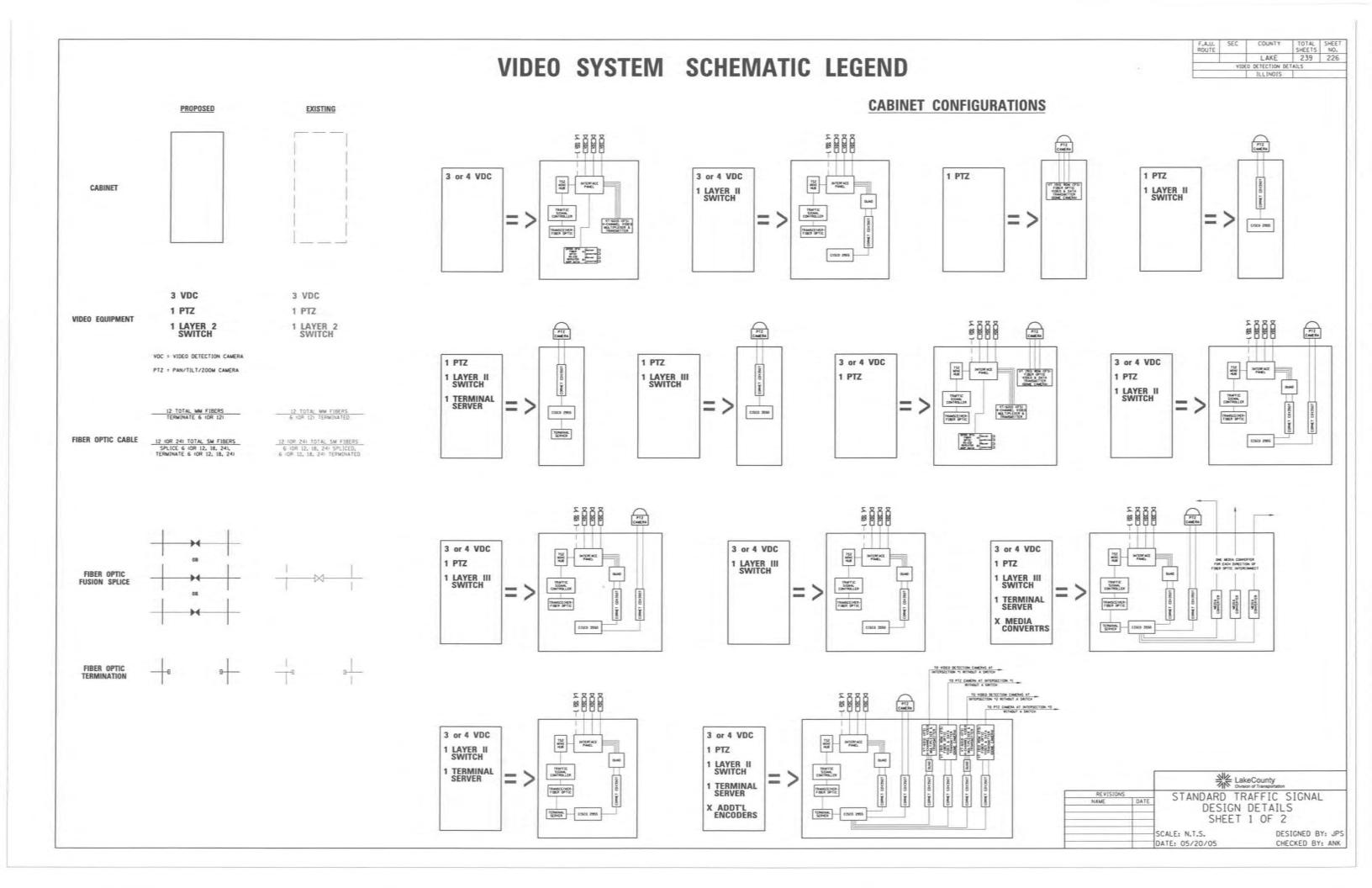
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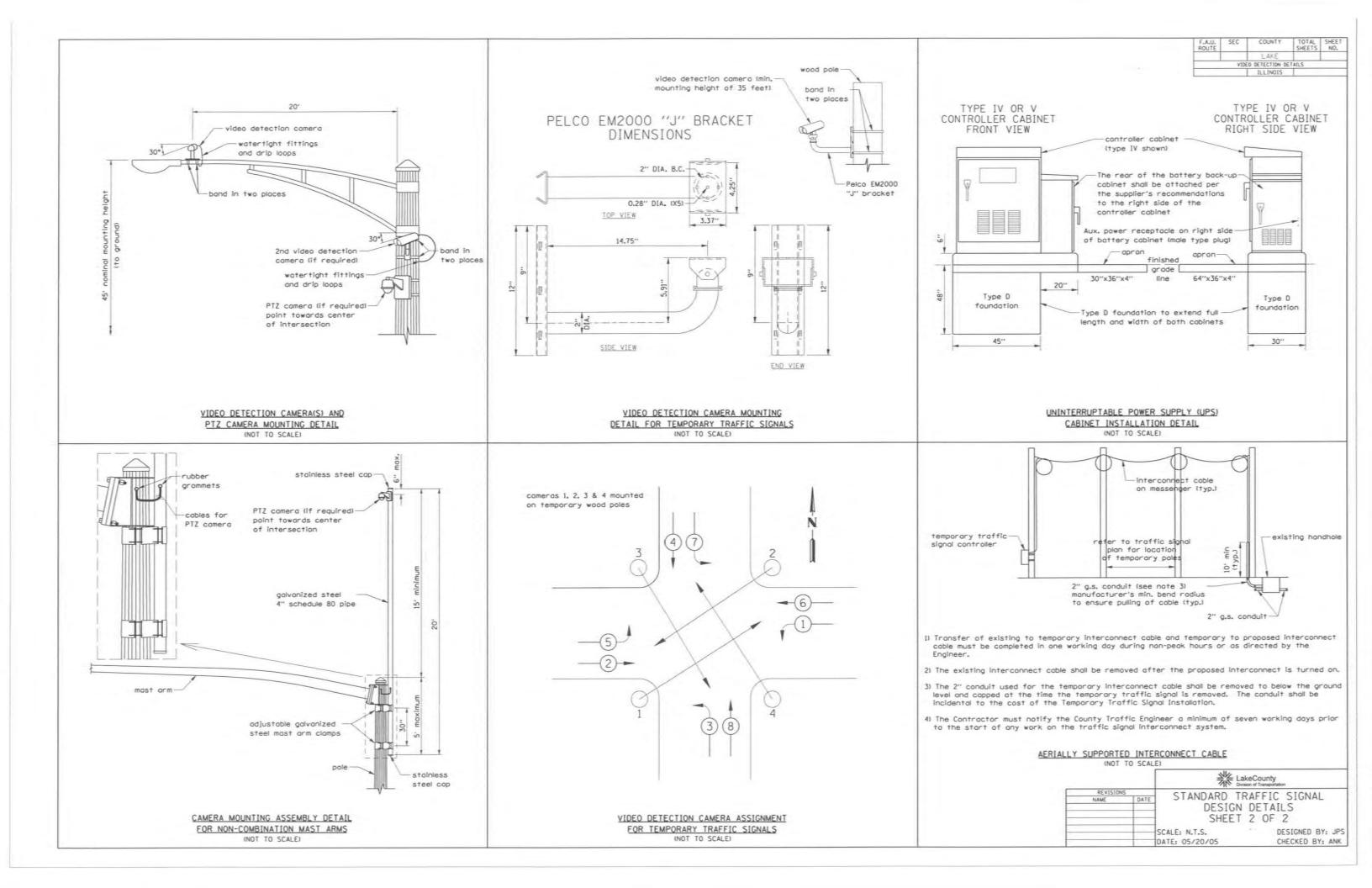
VIDEO SYSTEM SCHEMATIC

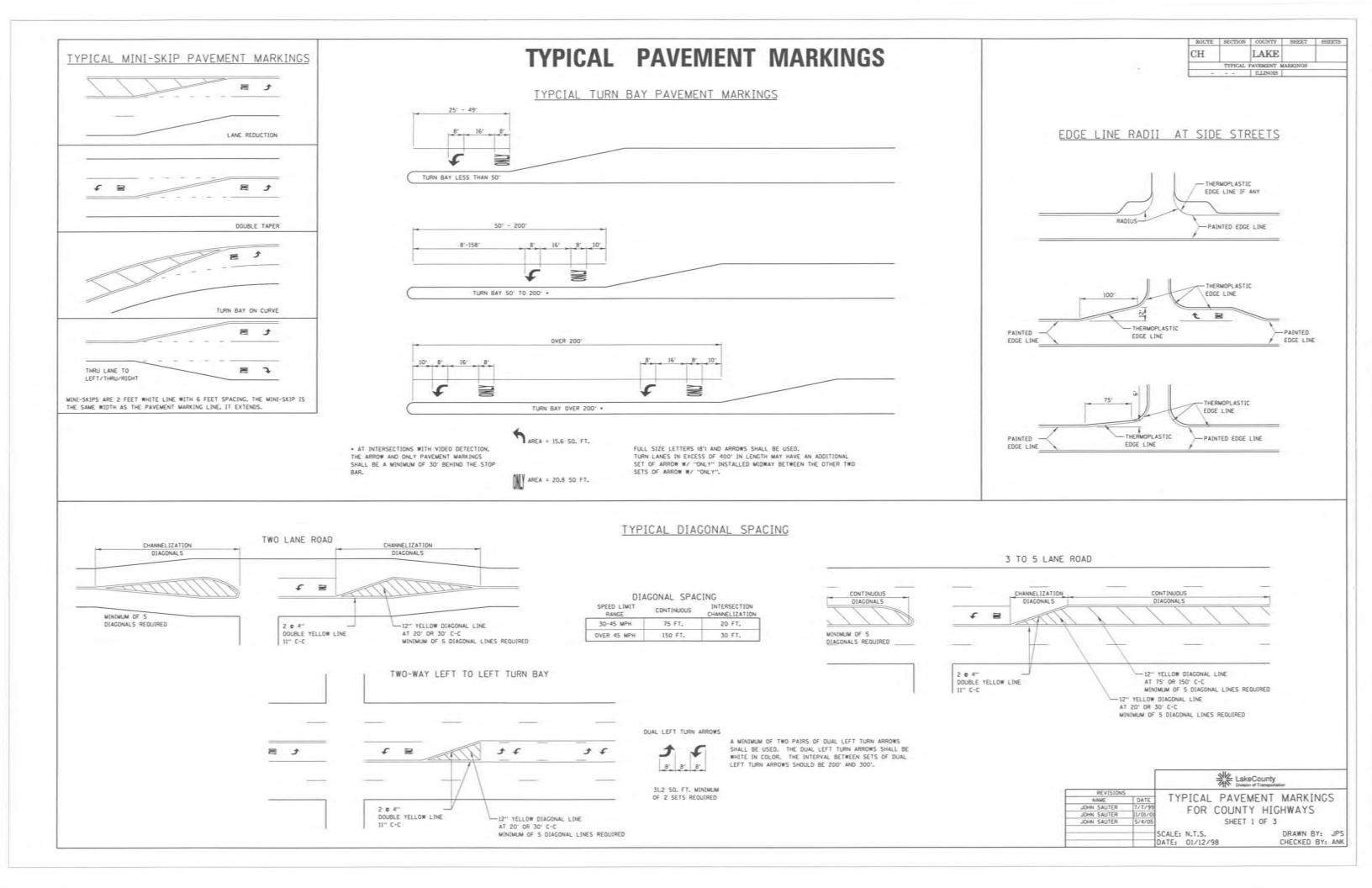
APTAKISIC ROAD FROM IL RTE 83 TO IL RTE 21 LAKE COUNTY, ILLINOIS PROJECT NO. XX-XX

SHEET 32 OF 37

DRAWING NO. 32







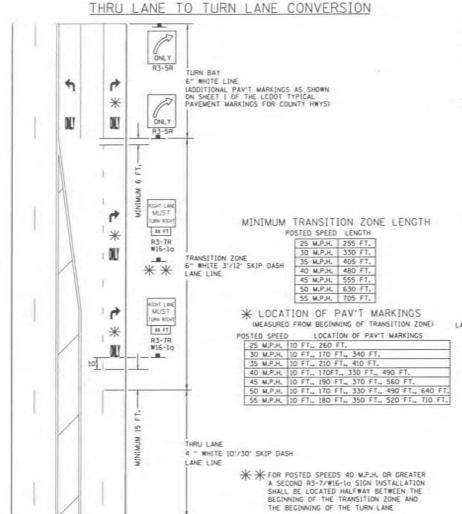
TYPICAL PAVEMENT MARKINGS AND RAISED PAVEMENT MARKERS

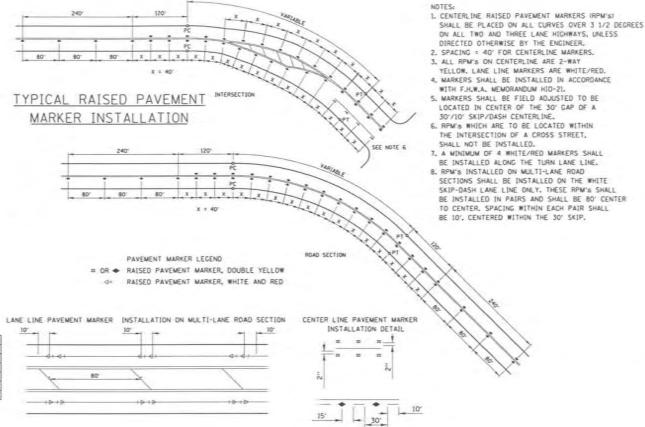
BOUTE SECTION COUNTY SHEET SHEETS

CH LAKE

TYPICAL PAVEMENT MARKINGS AND MARKERS

TLINOIS





SIDEMALK SIDEMA

CURB MARKING

PAVEMENT CROSS SECTION SHOWING TYPICAL PAVEMENT MARKINGS (2-LANE ROADWAY) II' Road Surface 1 1' LANE WIDTH IMAYED PREFORMED PLASTIC STATION NUMBER 12' LANE WIDTH Road Surface 12' LANE WIDTH INLAYED PREFORMED PLASTIC STATION NUMBER STATIONING DETAIL Flood Surface Flood Surface Road Surface Road Surface Road Surface Flood Surface

SINGLE STRIPE CENTERLINE DETAIL

DOUBLE STRIPE CENTERLINE DETAIL

Centerline markings are 4" lines at II" centers.

5"

VARIARI F

CANNOT BE PLACED.

REVISIONS
NAME | DATE

 PAINT CURB AND NOSE SOLID FOR 10' OR RADIUS OF NOSE, WHICHEVER IS GREATER.

2. PAINT MINIMUM OF 3 STRIPES IN DIRECTION OF TRAFFIC.

3. REDUCED SPACING USED TO OBTAIN 3-STRIPE MINIMUM.

4. STRIPING RECOMMENDED ONLY WHERE OPERATIONAL PROBLEMS DICTATE.
5. PAINT SOLID WHERE A MINIMUM OF 3 STRIPES

WHITE EDGE LINE

EDGE OF PAVEMENT

LakeCounty

Deletion of Transportation

TYPICAL PAVEMENT MARKINGS

FOR COUNTY HIGHWAYS

SPACING

8 4 8 4 8 4 8 4 8

JOHN SAUTER 7/7/99
JOHN SAUTER 11/01/05
FOR COUNTY HIGH
JOHN SAUTER 11/01/05
SHEET 2 OF 3

SCALE: N.T.S. DATE: 01/12/98

DRAWN BY: JPS CHECKED BY: ANK

PAVEMENT MARKING GUIDELINES - ENGLISH MEASUREMENTS

TYPE OF WARKING	WIDTH OF LINE	PATTERN	COLOR	SPACING / REMARKS
CENTERLINE OF 2 LANE PAVENENT	4 30,	SKIP-DASH	YELLOW	IO FT.LINE WITH 30 FT. SPACE
NO PASSING ZONE LINES: FOR ONE DIRECTION FOR BOTH DIRECTIONS	4 M. 2 0 4 M.	SOUD SOUD	YELLOW	5 1/2 IN.C-C FROM SKIP-DASH CENTERLINE 12 IN.C-C IOWIT SKIP-DASH CENTERLINE BETWEEN
CENTERLINE ON WULTHLANE UNDWIDED	204 M.	SOLID	YELLOW	II M. C€
LAKE LIKES	-4 IV.	SKIP-DASH	WHITE	ID FT.LINE WITH 30 FT.SPACE
DOTTED LINES (EXTENSIONS OF CENTER-LAKE OR TURN LAKE MARKINGS)	SAME AS LINE BEING EXTENDED	SKIP-DASH	SAME AS LIME BEING EXTENDED	2 FT. UNE WITH 6 FT.SPACE
EDGE LINES	5 IN, WHITE 4 IN, TELLOW	5000	WHITE - RIGHT YELLOW - LEFT	DUTLINE RAISED MEDIANS IN YELLOW
TURN LANE WARKINGS	6 IN.UNE FULL SIZE LETTERS AND SYMBOLS 18 FT.)	5000	инт Е	TURW ARROW 156 SO.FT. STRAIGHT ARROW 115 SO.FT. OWL 208 SO.FT. COMB.ARROW 250 SO.FT.
TWO WAY LEFT TURN MARKING	2 & 4 IN.EACH DIRECTION	SKIP-DASH AND SOUID	TELLOW	ID FT, UNE WITH 30 FT, SPACE FOR SKIP-DASH 5 I/2 IN.C-C BETWEEN SKIP-DASH LINE AND SOUD LINE
	8 FT. LEFT ARROW	IN PARS	WHITE	SEE TYPICAL TWO-WAY LEFT TURN MARKING DETAIL
CROSSWALK	12 14.0 90	5000	жн ит Е	12 W. LONGITUDINAL BAR WITH 24/36 W.SPACE 6 FT.TO 12 FT.WIDE SEE TYPICAL CROSSWALK WARKING DETAIL
STOP BARS	24 III.	SOLIO	WHITE	PLACE 4 FT. IN ADVANCE OF AND PARALLEL TO CROSSWALK, IF PRESENT, OTHERWISE PLACE AT DESIRED STOPPING POINT.
PAINTED WEDIAKS	2 e 4 IN, WITH BIN. DIAGONALS e 45 MO DIAGONALS USED FOR 4 FT, WIDE WEDIAN	5000	TELLON - 2-WAT TRAFFIC WHITE - HWAT TRAFFIC	IF IN. C-C FOR THE DOUBLE LINE SEE TYPICAL PAINTED WEDIAN MARKING DETAIL MINIMUM OF 5 DIAGONALS
GORE MARKING AND 8 IN. WITH 12 IN. CHANNELIZING LIMES DIAGONALS 0 45		5000	WHITE	DIAGONALS IS FT.CC ILESS THAN 30 MPHJ 20 FT.CC I30 TO 45 MPHJ 30 FT.CC IOVER 45 MPHJ MINIMUM OF 5 DIAGONALS
R.R. CROSSING 24 IN, TRANSVERSE LINES RR IS 6 FT. LETTER IS IN, LINE FOR "I"		5000	WHITE	SEE 1007 STD.780001 SO.FT. AREA OF: '8' - 3.5 SO.FT./ '8' '1' - 540 SO.FT.
SHOULDER DIAGONALS 12 IN. 0 45		5000	WHITE - RIGHT YELLOW - LEFT	50 FT. CC (LESS THAN 30 MPH) 75 FT. CC (30 TO 45 MPH) 150 FT. CC (107R 45 MPH) MANAGEM DE 5 (MACAGES)

FOR FURTHER CETALS ON PAVEMENT MARKINGS, REFER TO PART IN "WARKINGS" IN THE "ILLING'S MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES;" THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," AND LOST HIGHWAY STANDARD 78000D, EFFECTIVE JAM. 9, 1998.

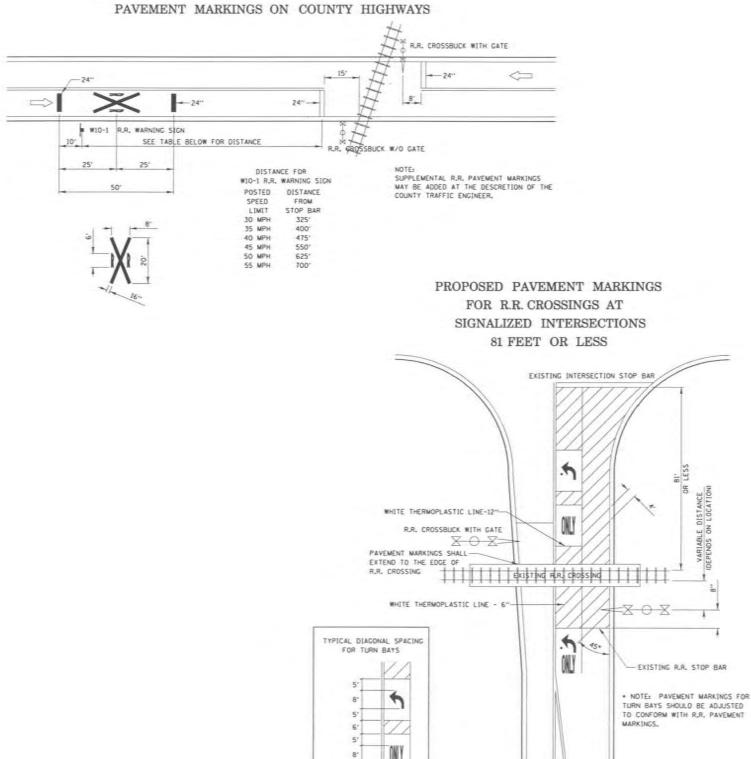
BOUTE SECTION COUNTY SHEET SHEETS

CH LAKE

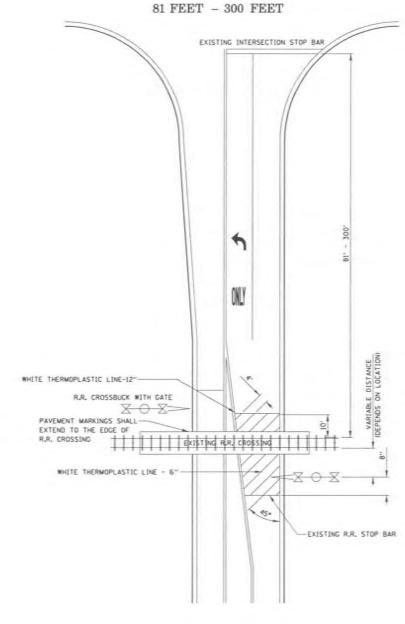
PAVEMENT MARKINGS POR BAILBOAD CROSSINGS

TYPICAL RAIL ROAD RELATED PAVEMENT MARKINGS

TYPICAL PLACEMENT OF R.R. WARNING SIGNS AND PAVEMENT MARKINGS ON COUNTY HIGHWAYS



PROPOSED PAVEMENT MARKINGS FOR R.R. CROSSINGS AT SIGNALIZED INTERSECTIONS

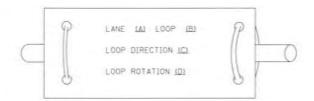


		≥ La	keCounty son of Transportation
REVISIONS		TYPICH DAVE	WENT HADVINGS
NAME	DATE	ITPILAL PAVE	MENT MARKINGS
JOHN SAUTER	9/25/98	END COLINI	TV LICUWAYS
JOHN SAUTER	7/7/99	FOR COUNTY HIGHWAYS	
		SHEET	3 OF 3
		SCALE: N.T.S.	DRAWN BY: JPS
		DATE: 01/12/98	CHECKED BY: AN

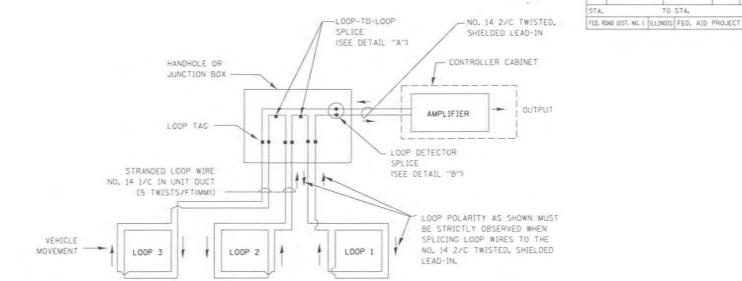
LOOP DETECTOR NOTES

- 1. EACH PAIR OF LOOP WIRES SHALL BE PLACED IN A SEPARATE UNIT DUCT FROM THE EDGE OF PAVEMENT TO THE HANDHOLE. SPACING BETWEEN THE HOLES DRILLED IN THE PAVEMENT SHALL NOT BE LESS THAN 6" (150 mm), UNIT DUCT SHALL BE INCLUDED IN THE COST OF THE LOOP WIRE.
- 2. THE NUMBER OF LOOP TURNS SHALL BE AS RECOMMENDED BY THE AMPLIFIER MANUFACTURER. ALL ADJACENT SIDES OF THE LOOPS SHALL BE INSTALLED IN SUCH A WAY THAT THE CURRENT FLOW IS IN THE SAME DIRECTION TO REINFORCE ITS MAGNETIC FIELDS FOR SMALL VEHICLE DETECTION.
- 3. EACH LOOP LEAD-IN SHALL BE IDENTIFIED AND PERMANENTLY TAGGED IN THE HANDHOLE. EACH LEAD-IN CABLE TAG SHALL INDICATE THE LOCATION OF THE LOOP, LOOP ROTATION (CLOCKWISE/COUNTERCLOCKWISE), LOOP LEAD-IN DIRECTION (IN OR OUT), LOOP CABLE NUMBER AND LOCATION IN CABINET, AND NUMBER OF TURNS IN THE DETECTOR LOOPS IN WATER PROOF INK AS INDICATED ON THE DISTRICT 1 STANDARD TRAFFIC SIGNAL DESIGN DETAIL. THE CONTRACTOR SHALL MARK LOOP LOCATIONS ON RECORD DRAWINGS AND PRESENT TO THE ENGINEER AFTER FINAL INSPECTION. LOOPS SHALL BE MARKED BY LANE AND LOOP NUMBER. SEE DETAIL BELOW.
- 4. ALL LOOP CABLE SHALL BE FASTENED WITH PLASTIC TIE WRAP TO THE HANDHOLE HOOKS.
- 5. IN ASPHALT PAVEMENT, LOOPS SHOULD BE PLACED IN THE BINDER AND DIVEHOLES MARKED AT THE CURB WITH A SAW-CUT. THE SAW-CUT SHALL BE CUT IN ACCORDANCE WITH LOCAL AND E.P.A. DUST CONTROL REQUIREMENTS. DETECTOR LOOP(S) SHALL NOT BE INSTALLED IN WET CONDITIONS AND THE SAW-CUTS MUST BE FREE OF DEBRIS AND RESIDUE SUCH AS DUST AND WATER WHICH IS TO BE ACHIEVED BY THE USE OF COMPRESSED AIR, WIRE BRUSHING AND HEAT DRYING ACCORDING TO SEALANT MANUFACTURER REQUIREMENTS. THE DETECTOR WIRE SHALL BE HELD IN PLACE BY THE USE OF FORM WEDGES. WEDGES SHALL BE SPACED NO MORE THAN 18" (450 mm) APART.
- 6. LOOP SPLICES SHALL BE SOLDERED USING A SOLDERING IRON. BLOW TORCHES OR OTHER DEVICES WHICH OXIDIZE COPPER CABLE SHALL NOT BE ALLOWED FOR SOLDERING OPERATIONS. SEE DETAIL BELOW RIGHT.
- 7. PREFORMED DETECTOR LOOPS SHALL BE USED, AS SHOWN ON THE PLANS, WHERE NEW CONCRETE PAVEMENT IS PROPOSED. THE INSTALLATION OF PREFORMED LOOPS SHALL BE IN ACCORDANCE WITH THE DISTRICT 1 SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

LOOP LEAD-IN CABLE TAG

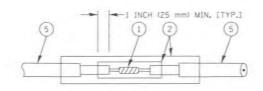


- A. LANE I IS THE LANE CLOSEST TO THE CENTERLINE OF THE ROADWAY
- B, LOOP *1 IS THE LOOP IN THE LANE CLOSEST TO THE INTERSECTION,
- C. LABEL LOOP CABLE "IN" OR LOOP CABLE "OUT".
- D. LABEL LOOP CABLE CLOCKWISE OR LOOP CABLE COUNTERCLOCKWISE.

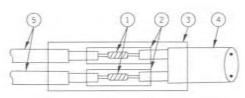


DETECTOR LOOP WIRING SCHEMATIC

- . LOOPS SHALL BE SPLICED IN SERIES.
- SAW-CUTS SHALL BE A MINIMUM WIDTH OF 5/16" (8 mm).
- . SAW-CUT DEPTHS SHALL BE 3" (75 mm), IF IN CONCRETE, THE SAW-CUT DEPTH SHALL BE TO THE TOP OF THE REINFORCEMENT.
- . LOOP CORNERS SHALL BE DRILLED WITH A 2" (50 mm) DIAMETER CORE.



DETAIL "A" LOOP-TO-LOOP SPLICE



DETAIL "B" LOOP-TO-CONTROLLER SPLICE

LOOP DETECTOR SPLICE

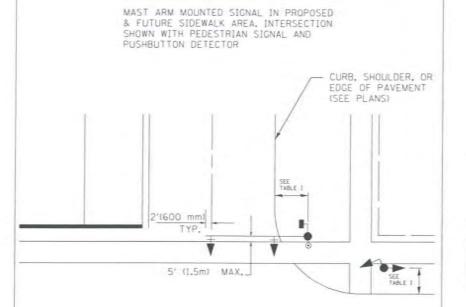
- (1) WESTERN UNION SPLICE SOLDERED WITH ROSIN CORE FLUX. ALL EXPOSED SURFACES OF THE SOLDER SHALL BE SMOOTH.
- (2) WCSMW 30/100 HEAT SHRINK TUBE, MINIMUM LENGTH 3" (75 mm), UNDERWATER GRADE.
- (3) WCS 200/750 HEAT SHRINK TUBE, MINIMUM LENGHT 6" (150 mm), UNDERWATER GRADE.
- (4) NO. 14 2/C TWISTED, SHIELDED CABLE.
- (5) LOOP CONDUCTOR WITH FLEXIBLE PLASTIC TUBE.

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORT	
NAME	DATE	ILLINUIS DEPARTMENT	DE TRANSPORTATION
CADD	5/30/00	DICTOIC	TONE
ADD NOTE NO. 8	11/12/01	DISTRIC	I UNE
BUREAU OF TRAFFIC	1-01-02	STANDARD TRA	FETC STONAL
		STAITDAID TINA	ITTO STORAL
		DESIGN D)ETAILS
		PONT VERT. NOVE	DRAWN BY: RWP

DATE 10/18/2002

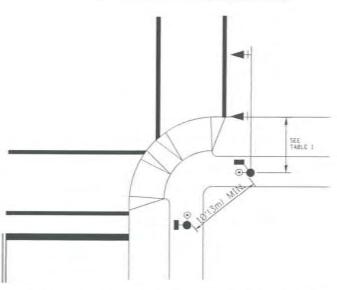
SECTION

TO STA



TRAFFIC SIGNAL MAST ARM AND POST

PEDESTRIAN SIGNAL PUSHBUTTON



RECOMMENDED PUSHBUTTON LOCATIONS FOR ACCESSIBLE PEDESTRIAN SIGNALS SHALL BE IN ACCORDANCE WITH THE CURRENT MUTCO (SEE NOTE 1). TO MEET MUTCO REQUIREMENTS, PEDESTRIAN SIGNAL PUSHBUTTONS MAY HAVE TO BE MOUNTED ON A SEPARATE POST,

-5.

F.A. SECTION COUNTY TOTAL SWEET NO.

STA. TO STA.

FED. ROMD DIST. NO. 1 | DLLINGIS | FED. ALD PROJECT

 AT ACCESSIBLE PEDESTRIAN SIGNAL LOCATIONS WITH PEDESTRIAN ACTUATION, EACH PUSHBUTTON SHALL ACTIVATE BOTH THE WALK INTERVAL AND THE ACCESSIBLE PEDESTRIAN SIGNALS.

AT ACCESSIBLE PEDESTRIAN SIGNAL LOCATIONS, PUSHBUTTONS SHOULD CLEARLY INDICATE WHICH CROSSWALK SIGNAL IS ACTUATED BY EACH PUSHBUTTON, PUSHBUTTONS AND TACTILE ARROWS SHOULD HAVE HIGH VISUAL CONTRAST (SEE THE DEPARTMENT OF JUSTICE'S AMERICANS WITH DISABILITIES ACT STANDARDS FOR ACCESSIBLE DESIGN, 1991). TACTILE ARROWS SHOULD POINT IN THE SAME DIRECTION AS THE ASSOCIATED CROSSWALK, AT CORNERS OF SIGNALIZED LOCATIONS WITH ACCESSIBLE PEDESTRIAN SIGNALS WHERE PEDESTRIAN PUSHBUTTONS ARE PROVIDED, THE PUSHBUTTONS SHOULD BE SEPARATED BY THE DISTANCE OF AT LEAST 10 FT (3m), THIS ENABLES PEDESTRIANS WHO HAVE VISUAL DISABILITIES TO DISTINGUISH AND LOCATE THE APPROPRIATE PUSHBUTTON.

PUSHBUTTONS FOR ACCESSIBLE PEDESTRIAN SIGNALS SHOULD BE LOCATED AS FOLLOWS:

- A: ADJACENT TO A LEVEL ALL-WEATHER SURFACE TO PROVIDE ACCESS FROM A WHEELCHAIR, AND WHERE THERE IS AN ALL WEATHER SURFACE, WHEELCHAIR ACCESSIBLE ROUTE TO THE RAMP.
- B: WITHIN 5 FT (1.5m) OF THE CROSSWALK EXTENDED.
- C: WITHIN 10 FT (3m) OF THE EDGE OF CURB, SHOULDER, OR PAVEMENT.
- D: PARALLEL TO THE CROSSWALK TO BE USED (SEE MUTCO FIGURE 4E-2).
- E: NORMAL PEDESTRIAN PUSHBUTTON MOUNTING HEIGHT SHOULD BE 3.5 FT (1.05m) ABOVE ADJACENT SIDEWALK
- 2. PEDESTRIAN SIGNAL FACES SHALL BE MOUNTED WITH THE BOTTOM OF THE HOUSING NOT LESS THAN 8 FT (2.4m) NOR MORE THAN 10 FT (3.0m) ABOVE THE SIDEWALK LEVEL AND SO THERE IS A PEDESTRIAN INDICATION IN THE LINE OF PEDESTRIANS' VISION WHICH PERTAINS TO THE CROSSWALK BEING USED.
- 3. THE BOTTOM OF THE HOUSING OF A VEHICLE SIGNAL FACE, NOT MOUNTED OVER A ROADWAY, SHALL BE AT LEAST 10 FT (3,0m) BUT NOT MORE THAN 15 FT (4,5m) ABOVE THE SIDEWALK OR, ABOVE THE PAVEMENT GRADE AT THE CENTER OF THE HIGHWAY IF NO SIDEWALKS EXIST.
- 4. THE BOTTOM OF THE HOUSING OF A VEHICLE SIGNAL FACE, MOUNTED OVER A ROADWAY, SHALL BE ACCORDING TO CURRENT STATE STANDARDS 877001 AND 877006. (16 FT (5mJ MIN., 18 FT (5.5mJ MAX., FROM HIGHEST POINT OF PAVEMENT)

PEDESTRIAN SIGNAL POST

PEDESTRIAN SIGNAL HEAD AND PEDESTRIAN PUSHBUTTON DETECTOR LOCATION

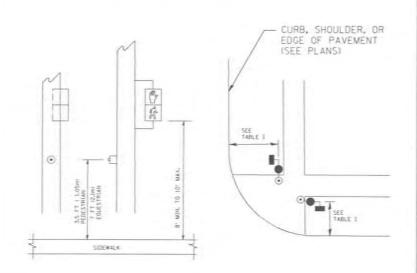


TABLE I

TRAFFIC SIGNAL EQUIPMENT	COMBINATION CONCRETE CURB AND GUTTER (MIN. DIST, FROM BACK OF CURB)	SHOULDER/NON-CURBED AREA (MIN. DIST. FROM EDGE OF PAVEMENT)
TRAFFIC SIGNAL MAST ARM POLE	6 FT Q.Bml	SHOULDER WIDTH + ZFT(0.6m), MINIMUM 10FT(3.0m)
TRAFFIC SIGNAL POST	4 FT (1,2m)	SHOULDER WIDTH + 2FT(0.6m), MINIMUM 10FT(3.0m)
PEDESTRIAN SIGNAL POST	4 FT (1.2m)	SHOULDER WIDTH + 2FT(0,6m), MINIMUM 10FT(3,0m)
PEDESTRIAN PUSHBUTTON	SEE NOTE 1	SEE NOTE 1

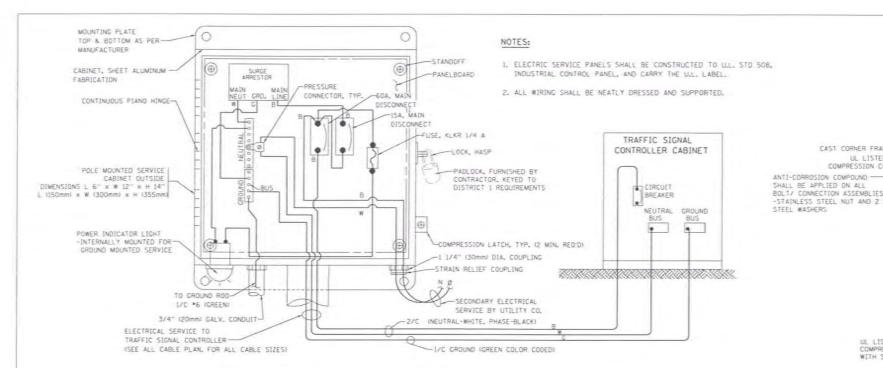
REVISIONS
NAME DATE
BUREAU OF TRAFFIC L/OL/O2

DISTRICT 1

STANDARD TRAFFIC SIGNAL
DESIGN DETAILS

SCALE, VERT. NOME DESIGNED BY: RMP

SCALE: VERT. NONE DATE 10/18/2002 DRAWN BY: RWP DESIGNED BY: DAD CHECKED BY: DAZ SHEET 2 OF 4



ELECTRICAL SERVICE - PANEL DIAGRAM (TYPICAL FOR POLE AND GROUND MOUNTED SERVICE) SERVICE INSTALLATION POLE MOUNT (SHOWN)

-DOOR OPENING LD.O.T. IDENTIFICATION DECALS SHALL BE MOUNTED TO FRONT OF ELECTRIC 10" (3,0m) MAX. HITH ITY 0008-ENCLOSURE -ELECTRICAL SERVICE LOCK MABOVE OR BELOW SEE PANEL DIAGRAM, ABOVE 13.75" (0.35= GROUND -CONDUIT BUSHINGS -SEE CABINET BASE, BELOW CHAMFER, CONTINUOUS SEE ELECTRICAL FINISH CRADE-PANEL DIACRAM SQUARE FOUNDATION " MAX TO TRAFFIC SIGNAL CONTROLLER (SOmm) GALV, CONDUST SERVICE INSTALLATION -3/4" x 10" (20mm x 3,0m) COPPER GROUND MOUNT [4]3 mm] 16,25" CABINET BASE

CABINET - BASE BOLT PATTERN INOT TO SCALE)

NOTES:

HANDHOLE COVER

DETAIL "A"

HANDLE

DETAIL "B"

RECESSED COVER

DIRECT BURIAL

TO CONTROLLER

DOUBLE HANDHOLE

TO POLE OR

- SEE DETAIL "B"

CAST CORNER FRAME WEB-

-STAINLESS STEEL NUT AND 2 STAINLESS

SEE DETAIL "A"

RECUIRED, ALL

HANDHOLES

ANTI-CORROSION COMPOUND -

UL LISTED GROUND COMPRESSION CONNECTOR

UL LISTED GROUND

WITH STAINLESS STEEL NUT

(CREEN)

HANDHOLE COVER & FRAME - GROUNDING DETAIL

(NOT TO SCALE)

GROUNDING SYSTEM

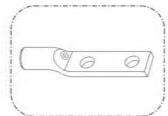
SECTION COUNTY FED. ROAD DIST, NO. | RLUNDIS FED. AID PROJECT

1. THE GROUNDING SYSTEM SHALL CONSIST OF AN INSULATED CONDUCTOR TYPE KLP, NO. 6 A.W.G., STRANGED COPPER TO BE INSTALLED IN RACEWAYS, THE GROUNDING CABLE SHALL BE INSTALLED IN A CONTINUOUS MANNER AS SHOWN ON THE CABLE PLAN PROVIDED. ALL GROUNDING CONDUCTORS SHALL BE BONDED TO METAL ENCLOSURE CHANDHOLE, POST, MAST ARM, CONTROLLER, ETC.), CROUND ROD SHALL BE 3/4" DIA. x 10'-0" (20mm x 3.0m) LONG, COPPER CLAD. ONE GROUND ROD SHALL BE INSTALLED AT ALL POST FOUNDATIONS, POLE FOUNDATIONS, CONTROLLER CABINET FOUNDATION AND ELECTRICAL SERVICE INSTALLATION AS INDICATED ON THE CABLE PLAN. IF THERE ARE ANY SPECIAL CONDITIONS SUCH AS SUB-SURFACE CONDITIONS OR INSTALLATION PROBLEMS, THE RESIDENT ENGINEER SHALL BE NOTIFIED OR CONTACT THE BUREAU OF TRAFFIC. ILLINOIS DEPARTMENT OF TRANSPORTATION DISTRICT DNE AT (847) 105-4139.

2. THE NEUTRAL CONDUCTOR AND THE GROUND CONDUCTOR SHALL BE CONNECTED IN THE SERVICE INSTALLATION. AT NO OTHER POINT IN THE TRAFFIC SIGNAL SYSTEM SHALL THE NEUTRAL AND GROUND CONDUCTORS BE CONNECTED.

3. ALL EQUIPMENT GROUNDING CONDUCTORS SHALL TERMINATE AT THE GROUND BUS IN THE CONTROLLER CABINET.

4. THE CONTRACTOR SHALL PROVIDE A GROUND CABLE WITH CONNECTORS BETWEEN THE HANDHOLE COVER AND HANDHOLE FRAME,



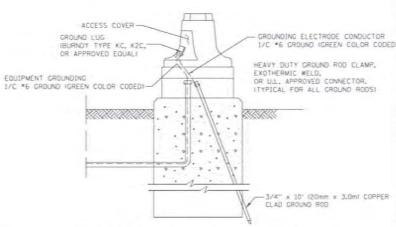




3/4" (20mm) HEAVY-DUTY GROUND ROD CLAMP IBURNOY TYPE CRC OR APPROVED EUALI

NOTES:

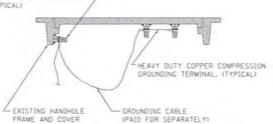
• ALL CLAMPS SHALL BE BRONZE OR COPPER, UL APPROVED.
• GROUND CABLE SHALL BE LOOPED OVER HOOKS IN THE HANDHOLES 6.5' (2.0m) SLACK SHALL BE PROVIDED IN SINGLE HANDHOLES 13' (4.0ml OF SLACK SHALL BE PROVIDED IN DOUBLE HANDHOLES, 5' (1.4m) OF SLACK SHALL BE PROVIDED BETWEEN FRAME AND COVER.



MAST ARM POLE / POST-GROUNDING DETAIL

REVISIONS		DI MINTE DEDARTHEN	T OF TRANSPORTATION
NAME	DATE	ILLINOIS DEPARTMEN	II OF THANSFORTATION
CADD	5/30/00		
CADD	3/15/01	DISTR	TCT 1
BUREAU OF TRAFFIC	1/01/02	D1511	1011
		STANDARD TR	AFFIC SIGNAL
			DETAILS
		DESTON	DETTILO
		SCALE: WERT. NONE HORIZ. DATE 10/18/2002	DRAWN BY: HWP DESIGNED BY: DAD CHECKED BY: DAZ SHEET 3 OF 4

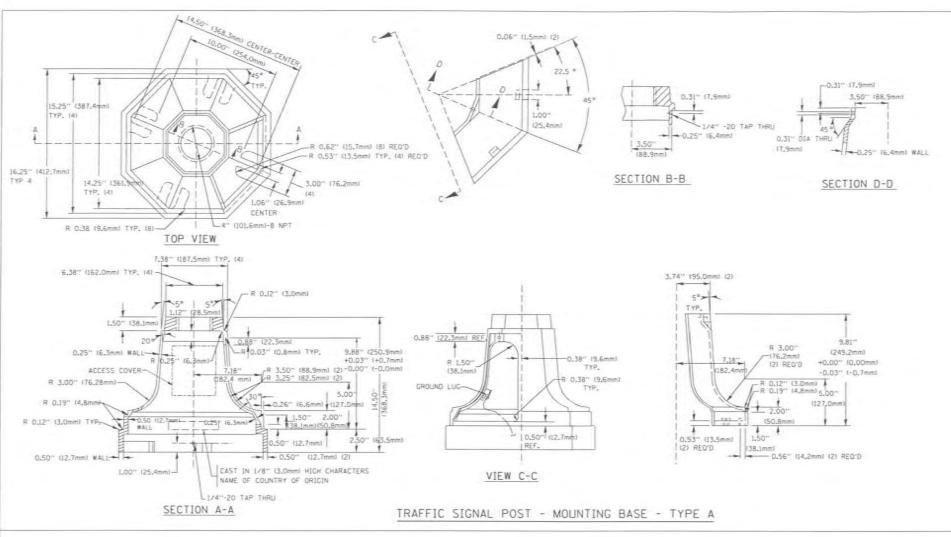
(2) 1/2" x 1 1/4" STAINLESS STEEL BOLT WITH SPLIT LOCK WASHER AND NYLON INSERT LOCKOUT WELDED TO 7 FRAME AND TO COVER ITYPICALL

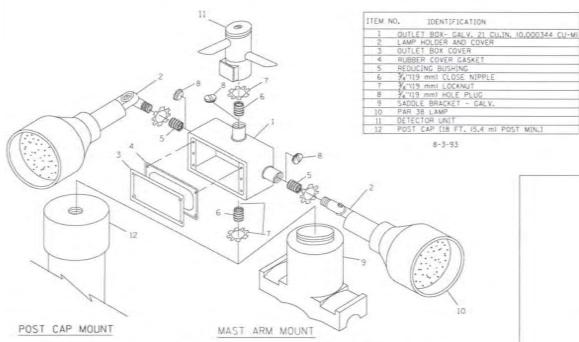


EXISTING HANDHOLE COVER & FRAME - GROUNDING DETAIL

INOT TO SCALE

10/18/2002 e/projects/diststdVs05.6gn VATS05

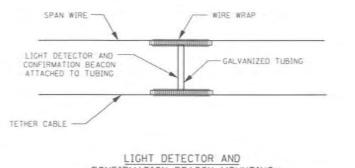




EMERGENCY VEHICLE DETECTOR WITH CONFIRMATION BEACON MOUNTING DETAIL

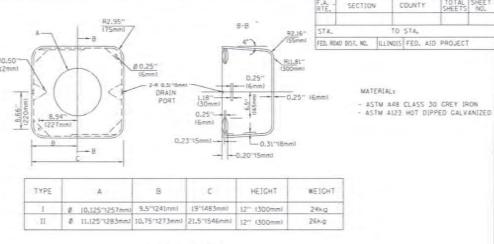
NOTES:

- ALL ELECTRICAL ITEMS, EXCEPT ITEMS *2 AND *11 SHALL BE ALUMINUM OR GALVANIZED
- Z. ITEM *I- OZ/GEDNEY FSX-I-50 OR EQUIVALENT ITEM *2- MULBERRY CON-0-SHADE LAMP SHIELD OR EQUIVALENT ITEM *9- "BAND-IT" SADDLE BRACKET OR EQUIVALENT
- 3. WHEN POST MOUNTING IS SPECIFIED, ITEM *9 SHALL NOT BE REDUIRED. THE DETECTION UNIT SHALL BE MOUNTED DIRECTLY ON TOP OF THE CAP BY DRILLING AND TAPPING A 1/4"119 mm) HOLE WITH PIPE THREADS. THE POST CAP SHALL EITHER BE SCREWED TO THE TOP OF THE POST OR A MINIMUM OF 3 TIGHTENING SCREWS SHALL BE REQUIRED ON EACH CAP.

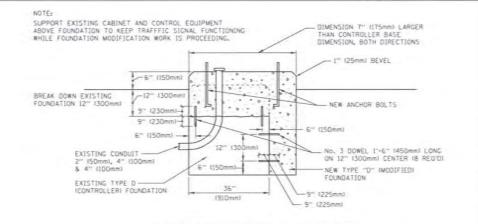


LIGHT DETECTOR AND CONFIRMATION BEACON MOUNTING FOR TEMPORARY TRAFFIC SIGNALS

(NOT TO SCALE)

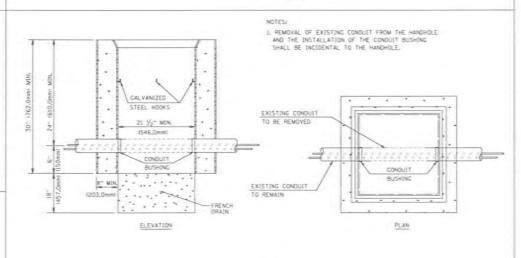


SHROUD DETAIL



MODIFY EXISTING TYPE "D" FOUNDATION

INOT TO SCALE



DETAIL HANDHOLE TO INTERCEPT EXISTING CONDUIT

REVISIONS		DI INDIS DEDIGENON	T OF TRANSPORTATION
NAME	DATE	ILLUNDIS DEPARTMEN	OF THANSFURTATION
BUREAU OF TRAFFIC	5/30/00		
BUREAU OF TRAFFIC	3/15/01	DISTR	ICT 1
BUREAU OF TRAFFIC	11/12/01	013111	1011
BUREAU OF TRAFFIC	1-01-02	STANDARD TRAFFIC SIGNAL	
		DESIGN	
		SCALE: VERT. NONE	DRAWN BY: RWP DESIGNED BY: DAD
		DATE 10/18/2002	CHECKED BY: DAZ SHEET 4 OF 4

IO/18/2002 c:lyrojeds/diststd/ts05.dgn VI-TS05